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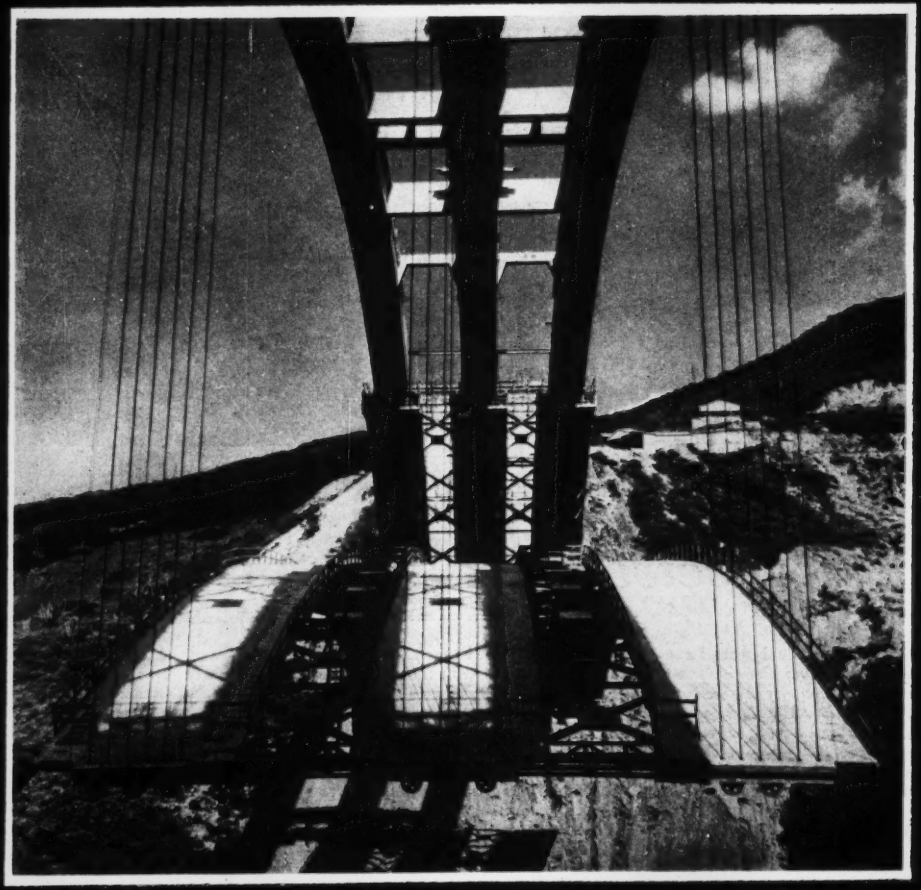

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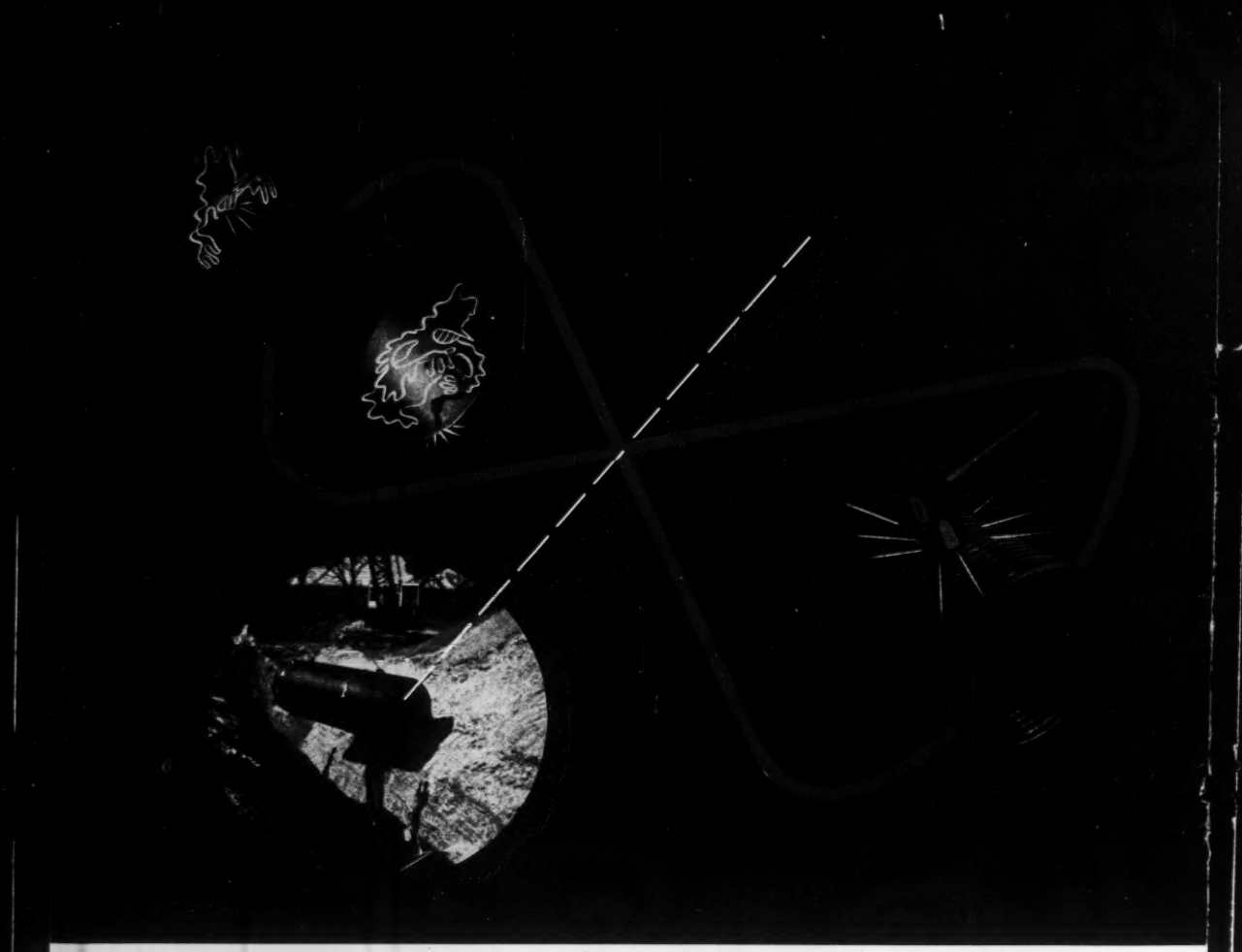

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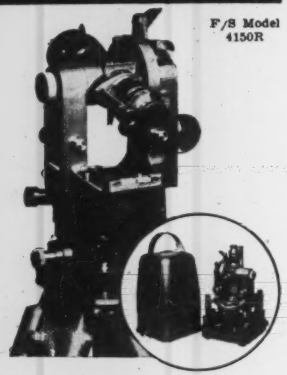

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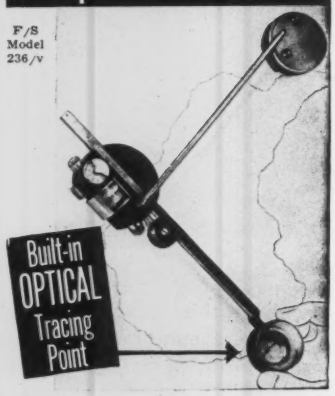

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Volume 149 September 11, 1952 No. 11

WALDO G. BOWMAN
Editor

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ROBERT F. BOGER
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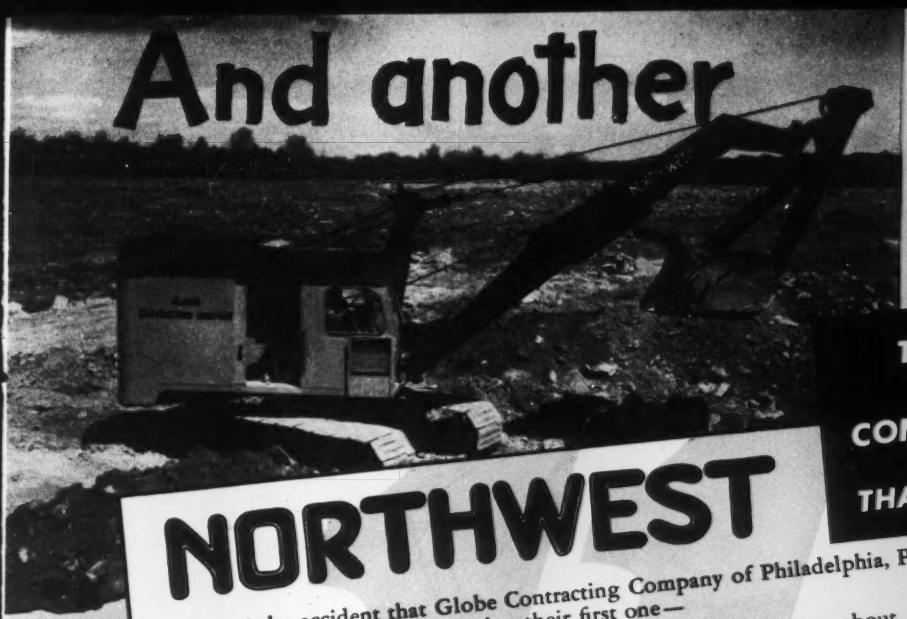

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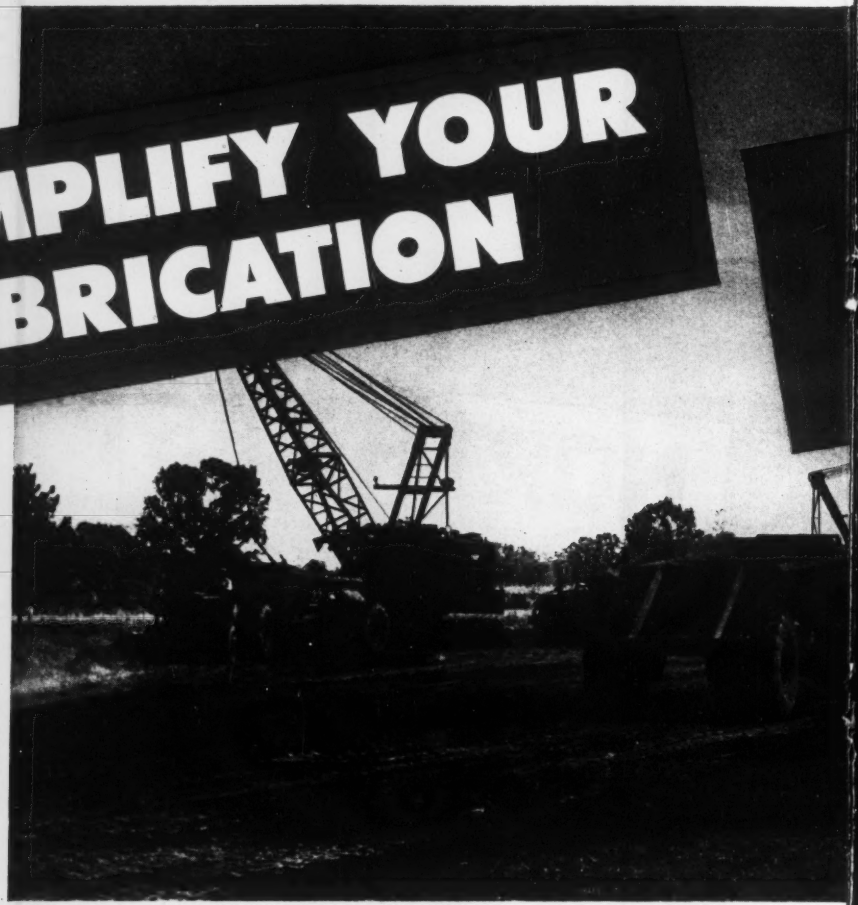

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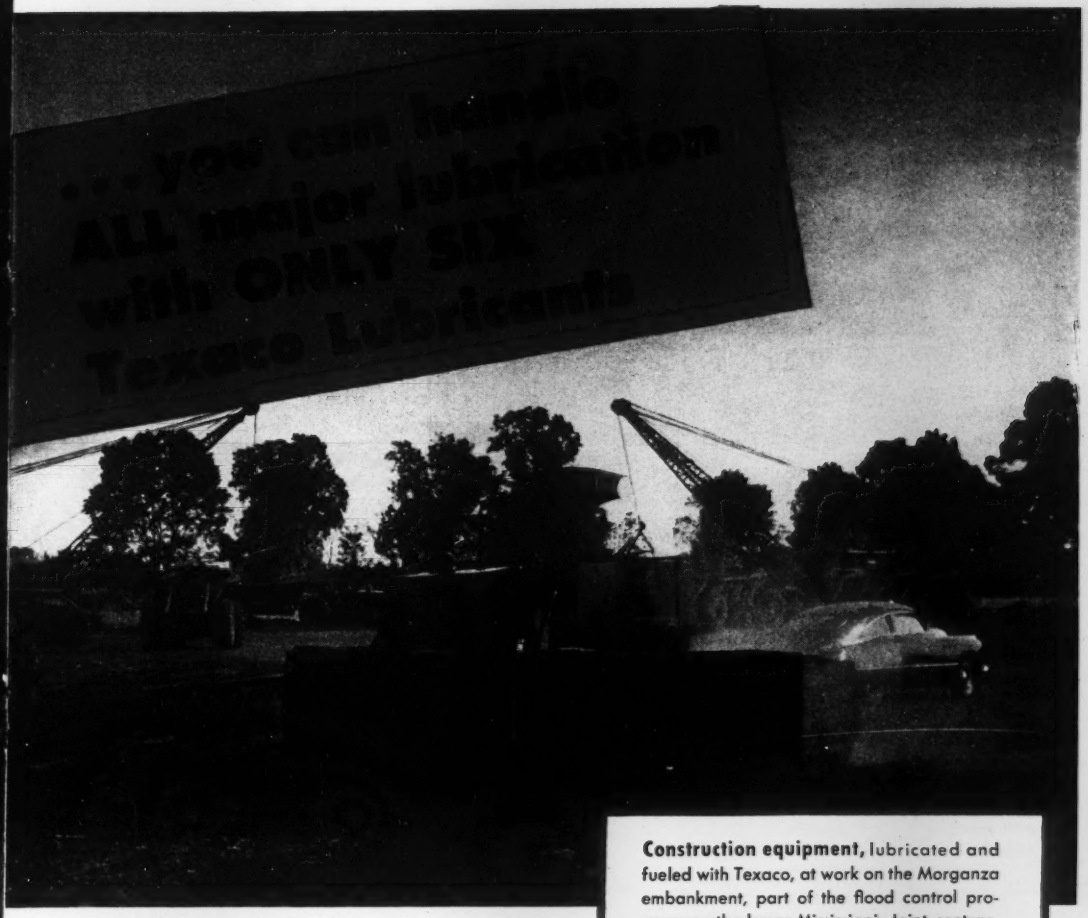

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READER COMMENT

Floating caissons

Sir: In connection with your article and editorial on the remarkable floating caisson construction of Pier 57, in the Aug. 7 issue, it is of structural and historical interest to mention the studies, model tests and designs in Italy during the 1930-s and the Derwent River Bridge built at Hobart, Tasmania in 1944.

The Italian designs included a Lake Maggiore Bridge, 13x53x9000 ft, continuous reinforced concrete pontoon; a similar, smaller, Lake Como Bridge; also other floating railway and highway bridges, piers, harbors and airports. Model tests indicated that the dissipation of wave energy by connected floating beams is not the sum but the product of the effects of the beams.

The Derwent River Bridge (ENR Aug. 9, 1945 p 181), is a 2,818 ft span, 443 ft rise, 3-hinged circular arched floating bridge with 2740 ft radius. Reinforced concrete boxes, 12x36x132 ft were united in two monolithic arched pontoons each 1580 ft long. The economy of this bridge recommends the study of this type of structure where circumstances permit its application.

In 1946 the writer designed car float guide racks, 8x9x360-ft fendered boxes, which were floated to the site, seated by tide and anchored to three obelisk shaped pile towers composed of four concrete filled steel pipes with reinforced concrete top framing.

Louis Balog
Consulting Engineer
Binghamton, N. Y.

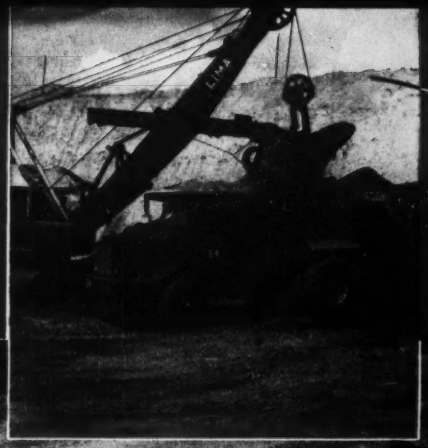
Favors alternate designs

Sir: Referring to the letters from Fred O. Koch, Great Falls, Mont., and Macfarlane & Sadler, Richmond, Va., and including your editors' comment in the issue of July 31, I feel the following comments will be of interest:

1. I agree with Mr. Koch that alternate designs on public work should not be allowed. The management of public work contracts is on a different basis than for private work. Therefore the customary practice of competitive bids on definite plans and specifications, with award to the lowest responsible bidder is best in the long run for the taxpayers' interests.

2. With regard to private work, I do not agree with either Mr. Koch or Mr. Macfarlane. Here the general contractor can very often, through

(*Continued on p. 10*)



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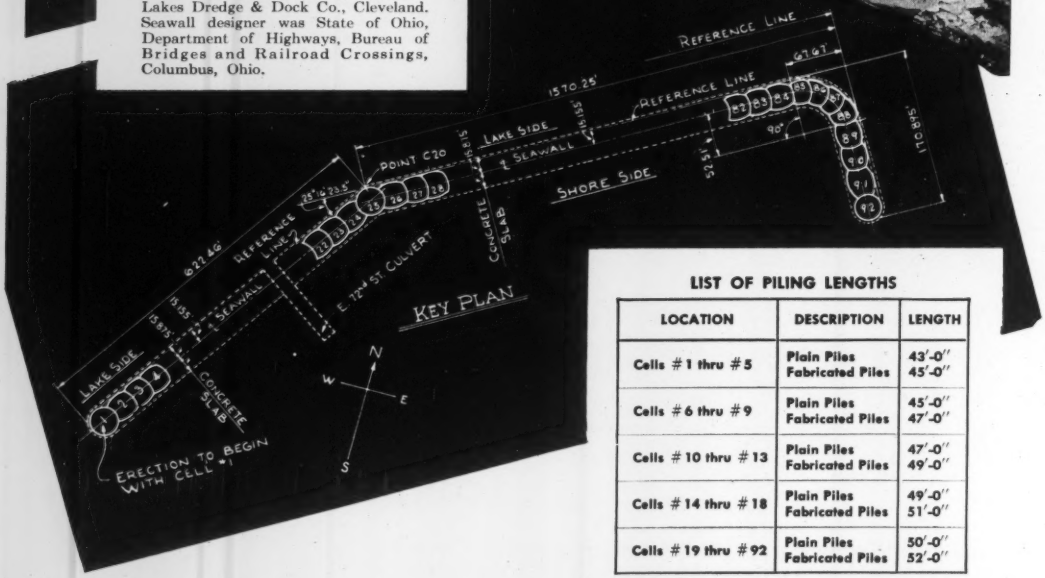
92 cells of U·S·S Steel

AERIAL VIEW of the Gordon Park Seawall, Cleveland, Ohio. 92 interlocked cells of U·S·S Steel Sheet Piling make up the wall, with a portion already capped with concrete in view at the lower right. Contractor was the Great Lakes Dredge & Dock Co., Cleveland. Seawall designer was State of Ohio, Department of Highways, Bureau of Bridges and Railroad Crossings, Columbus, Ohio.



LIST OF PILING LENGTHS

LOCATION	DESCRIPTION	LENGTH
Cells # 1 thru # 5	Plain Piles Fabricated Piles	43'-0" 45'-0"
Cells # 6 thru # 9	Plain Piles Fabricated Piles	45'-0" 47'-0"
Cells # 10 thru # 13	Plain Piles Fabricated Piles	47'-0" 49'-0"
Cells # 14 thru # 18	Plain Piles Fabricated Piles	49'-0" 51'-0"
Cells # 19 thru # 92	Plain Piles Fabricated Piles	50'-0" 52'-0"

Sheet Piling

FORM NEW GORDON PARK SEAWALL AT CLEVELAND

TO protect Cleveland's Lake Boulevard from the frequent and severe storms that lash Lake Erie, a new seawall is being constructed in the Gordon Park area. It is made up of 92 cells of U·S·S Steel Sheet Piling to be capped with concrete.

Ground level is exceptionally low at this point and soil conditions vary from sandy clay to stiff clay. The U·S·S Steel Sheet Piling, in average lengths of 49 feet, is being driven to a penetration depth of 20 feet.

The seawall, approximately one-half mile in length, is using a total of 4,440 tons of MP101 piling sections, along with 240 tons of fabricated "Y" piling sections.

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THIS CONSTRUCTION VIEW of the Gordon Park Seawall shows how cells are joined by fabricated "Y" sections of U·S·S Steel Sheet Piling. Cells are basically MP101 sections.

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U·S·S STEEL SHEET PILING

2-488

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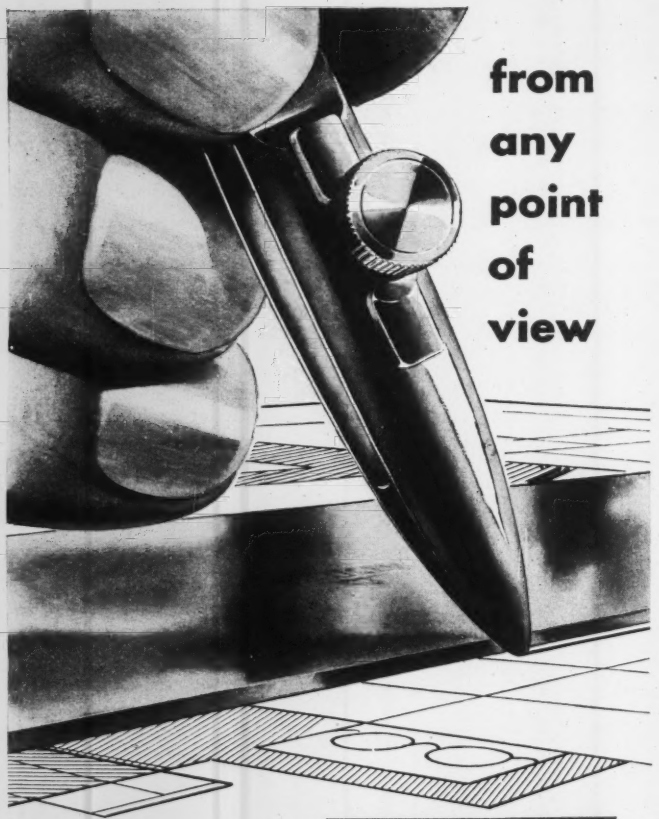

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(Continued from page 6)

alternate designs, give to the owner a worthwhile saving in cost and very often a better building as compared to the original plans and specifications. This is not a reflection on the architects and engineers, for general contractors possess a wealth of information as to costs, methods of design, etc., and they should be in position to offer suggestions of merit to the owner.

3. Thus on private work the owner can consider the merits of the contractors' alternate offer and if found to be favorable, accept them. I have executed many contracts in the past 30 year through alternate design bid changes with absolute satisfaction to the owners, their architects and engineers. Political control is largely the reason that public work cannot be contracted for on the same basis.

4. Mr. Koch is correct. Alternate designs by the contractor place an extra burden on the contractor, and give the contractor with a large organization an advantage over the smaller contractor in submitting bids for the work.

5. I cannot endorse Mr. Macfarlane's statement: "The would-be contractor in competition owes nothing to the owner. He deals with the owner at arm's length," for in contracting as in every other field of endeavor, integrity is the keystone of the business. Without it, the contractor, architect, engineer and, in fact, any business organization will soon drift downward and finally disappear. Your editors' comment is correct.

The ideal situation is for the owner, his architect and engineer and his contractor, selected either through competitive or cost plus fixed fee basis to have a wholesome respect for each other and an earnest desire to look out for each other's interests as he would his own.

THOMAS F. GIBSON,
Consulting Engineer
Haddonfield, N. J.

Sanitary engineer training

Sir: The problems raised in "What Training for Sanitary Engineering" (ENR July 24, 1952, p 40) have been reason for considerable concern for sometime in the Medical Service of the United States Air Force, another large employer of sanitary engineers. Our experience in this command has been that any well qualified civil, chemical, mechanical, or electrical engineer can be given additional training and perform adequately in the environmental health functions.

Based on observations of 20 recent college graduates who have been as-

(Continued on page 14)

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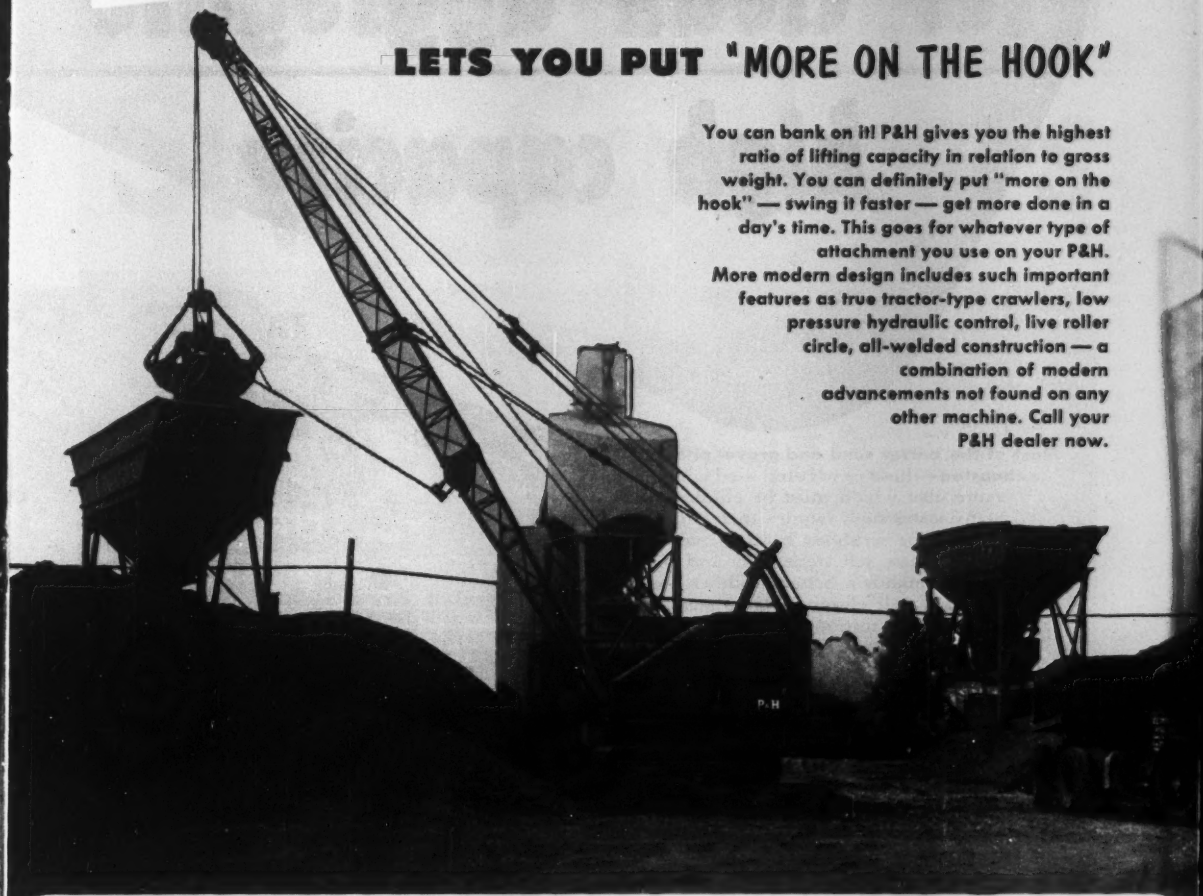

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for clean aggregate high capacity

Three of the five 60-inch diameter Telsmith Super-Scrubbers in Colonial Sand & Stone Co., Inc. plant, Port Washington, N. Y.

Most of the better sand and gravel pits are exhausted—those now being used contain more clay which must be eliminated. Many states now require that crushed stone be scrubbed before screening to eliminate soft stone, clay and dirt. This demands a better scrubber—one which will eliminate large amounts of clay with a minimum of expense for installation, water, power, and up-keep. Telsmith's answer is the Super-Scrubber—proven successful in many of the toughest pits and quarries.

Outstanding features of the Super-Scrubber are its high speed, terrific impact and grinding action—very much like that of a ball mill. Aggregate travels from feed to discharge end against clean water flowing in the opposite direction—emerges clean—with clay and dirt disintegrated and carried away by the water. Best results with maximum scrubbing efficiency on coarse aggregate are obtained with the sand removed.

Designed to carry a heavy aggregate load—Telsmith Super-Scrubbers give years of service with a minimum of up-keep expense. Four sizes: 60-inch to 96-inch diameter—capacities, 50 to 250 tons per hour. Send for Bulletin 266.

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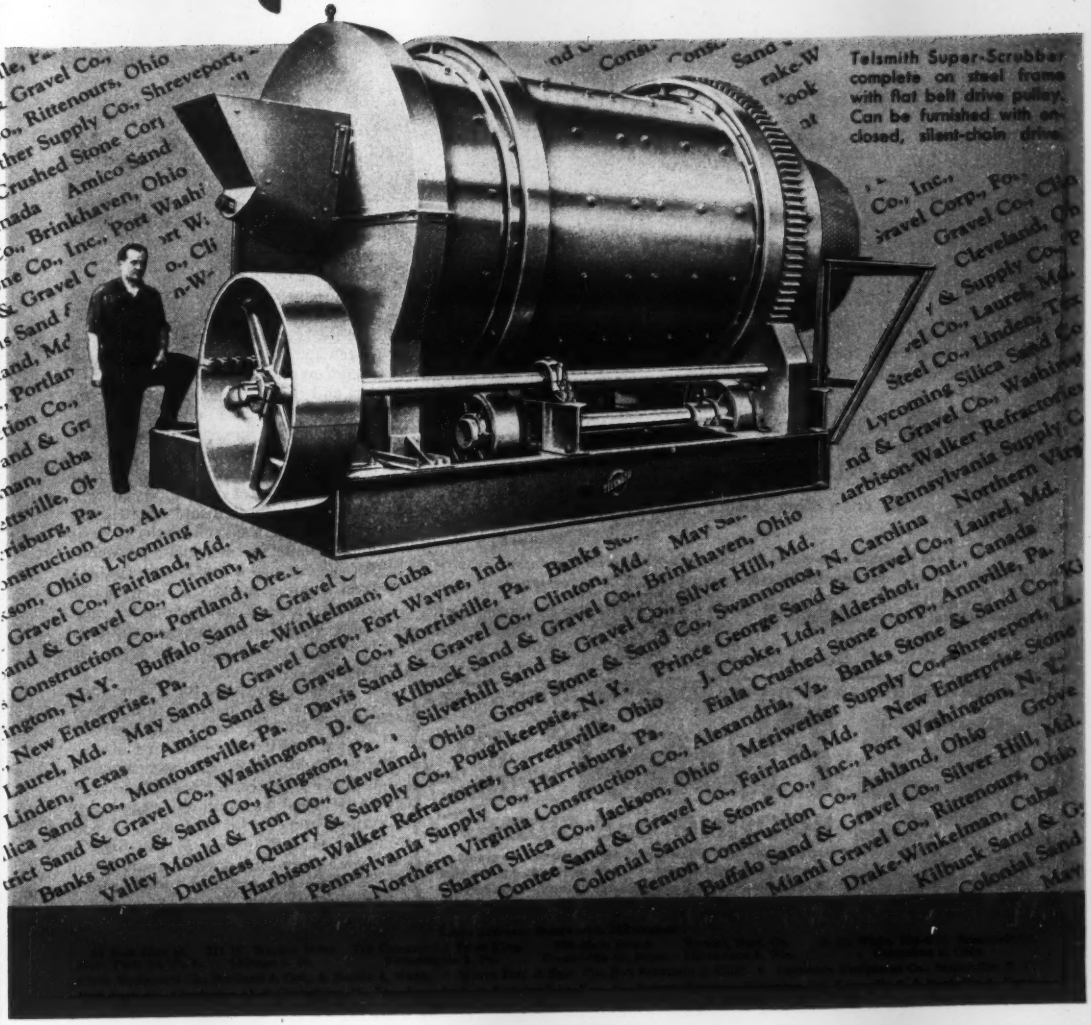

Telsmith Super-Scrubber complete on steel frame with flat belt drive pulley. Can be furnished with enclosed, silent-chain drive.

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Drake-Winkelman, Cuba
Kilbuck Sand & Gravel Co., Clinton, Md.
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Silverhill Sand & Gravel Co., Brinkhaven, Ohio
Grove Stone & Sand Co., Silver Hill, Md.
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J. Cooke, Ltd., Aldershot, Ont., Canada
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Meriwether Supply Co., Shreveport, La.
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Crushed Stone Corp.
Amico Sand
Buffalo Sand & Gravel Co., Fort Wayne, Ind.
Drake-Winkelman, Cuba
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Amico Sand & Gravel Co., Clinton, Md.
Construction Co., Portland, Ore.
Gravel Co., Fairland, Md.
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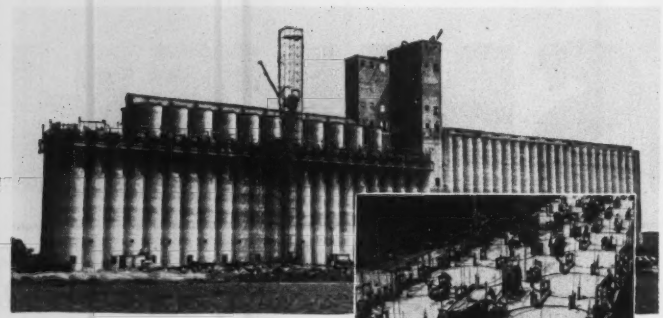

337′ x 48′ slip-form deck used to pour addition to Farm Bureau grain terminal at Canal Winchester, Ohio. Once a minute, 192 screw jacks were turned to raise entire forms 15/100". Carts, served from central hopper, distributed concrete to the continuously rising forms.

How to pour a 1,200,000 bushel basket — in one piece

By a continuous pour of 6,000 cu. yds. of ready-mixed concrete, into slip-forms raised on jackrods at the rate of .15" every minute, this elevator addition was completed in 168½ hours. The 24 bins, each 20′ in diameter and 127′ high, and interstitial walls, covering a 337′ x 48′ area, form one monolithic structure without joint or seam.

Because concrete design envisions a homogeneous material, of numerous elements completely mixed, the ready-mixed concrete industry certifies by Rating Plate those truck mixers and agitators which have the proper design, capacity, drum speed, mixing action and water control necessary to produce a homogeneous concrete of uniform strength.

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(*Continued from p. 10*)

signed to the medical service of the Air Materiel Command for training during the past two years, I am convinced that a compromise of the views expressed by Professors Boyce and Stiemke with regard to training and of Mr. Miller with regard to utilization, represents the best approach of the future. Professor Babbit's recent book "Engineering in Public Health" amply represents a picture of the field as it is now developing.

I must take issue with Prof. Stiemke with regard to the elimination of thermodynamics, applied mechanical and electrical engineering from the curricula to be followed by the embryo engineer in environmental health. The problems of atmospheric pollution, nuclear energy, heating and ventilation, and the hygiene of housing and industrial structures require that the engineer be well founded in basic subjects.

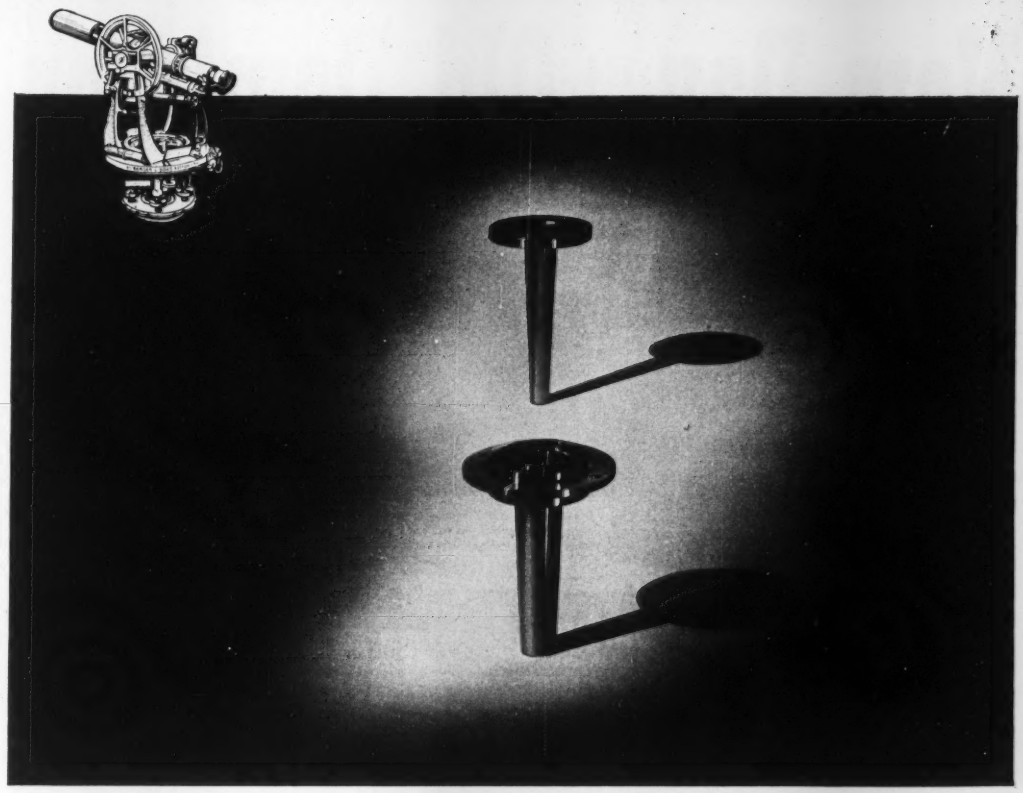
To Professor Boyce's comments I would add that the graduate curricula should include training in physiology and occupational health hazards control as well as the other aspects of environmental health. Too few engineers have adequate knowledge of how hazards of the environment enter the body—and the fate thereof after entry.

As to undergraduate education, there is a need for the addition to all engineering courses of at least one semester of elementary statistics. Professional engineers must use the laws of statistics and this is particularly true of the engineer in environmental health.

Substituting biology, including bacteriology, for mechanics, advanced chemistry for transportation, and inserting a general course in environmental sanitation would afford excellent base for the civil engineer desiring to major in environmental health. As suggested by Prof. Boyce, graduate level training should be open equally to civil, electrical and mechanical engineers, either in general environmental health or specialized aspects of the program.

Applied scientists, for whom there is surely a need in our complex technology, tend to move into the void created by the lack of training of engineers who deal in environmental health. Engineering education must be designed to equip the engineer to utilize properly his own skills in conjunction with others in the field in such a manner as not to be supplanted by those less qualified in all aspects of control of the forces of nature.

ALVIN F. MEYER, JR.
Lt Colonel, USAF (MSC)
Deputy for Environmental Health Engineering
Wright-Patterson Air Force Base, Ohio



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And that's not all: Berger Transit Centers are all bronze. The inner spindle is bell metal with equal coefficient of expansion—another reason why they revolve so freely within each other without fretting or binding under any variation of climatic condition. They're larger, too, with greater bearing contact between the inner and outer working areas—as much as 5½ square inches in a 6¼-inch Berger Transit.

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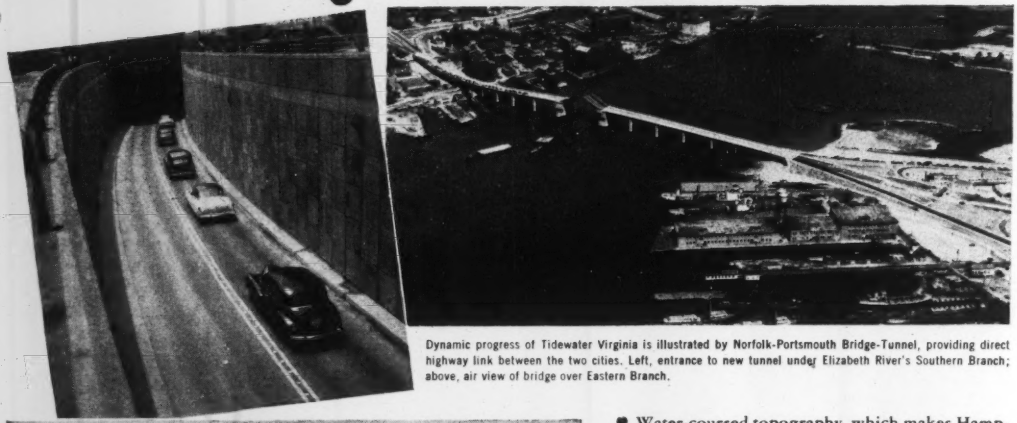
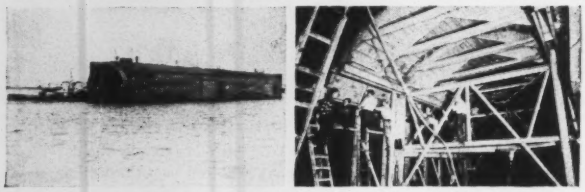
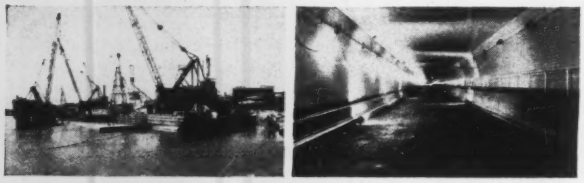


Dynamic progress of Tidewater Virginia is illustrated by Norfolk-Portsmouth Bridge-Tunnel, providing direct highway link between the two cities. Left, entrance to new tunnel under Elizabeth River's Southern Branch; above, air view of bridge over Eastern Branch.

Tunnel Building Takes Pinpoint Precision and Heavy Construction Muscle



Elizabeth River Tunnel is tenth of trench type in U. S., fourth of its kind built by Merritt-Chapman & Scott. For 2117' under-water section, 7 double-shelled steel tubes, each about 300' long, 35'4" diameter, were launched and towed to site. Next step was to concrete 18" inner ring and 22'-wide roadway inside each section, piping concrete through hatchways along top into traveller forms. Then hatchways were concreted and sealed.



Almost awash, tubes are held by derrick slings, as concrete is tremied into place between inner and outer shells, until tubes lose buoyancy. Tube's 9100 tons "in the dry" becomes less than 100 tons under water. Divers bolt sections together, rest of space between inner and outer shells is filled, and section joints sealed, with concrete. Trench is back-filled, bulk-heads holed through, joints faced with concrete—and here's your tunnel!

● Water-coursed topography, which makes Hampton Roads one of the world's great harbors, has long handicapped land transportation. A key project in solving this problem is the Norfolk-Portsmouth Bridge-Tunnel and related facilities, completed at a cost of $23 million.

The trench-type tunnel, 3,315 ft. long, under the Southern Branch of the Elizabeth River is linked with a beautiful, new four-lane bridge, 2,135 ft. long, over the Eastern Branch.

Motorists who now travel swiftly between Norfolk and Portsmouth, instead of waiting for traffic-glutted ferries, are the first to appreciate the engineering and construction know-how which went into this great project.

For one thing, the logistics of a job like this are an achievement of first rank. Clock-like co-ordination meshed men, equipment and materials together as one team. And, team-player that it is, Lone Star delivered 179,233 barrels of cement on the dot of every promise, for the very good reason that . . .

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TIDEWATER CONSTRUCTION CORPORATION, Norfolk
(Bridge and Approaches)
STERLING FOUNDATIONS, INC., Lynbrook, N. Y.
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PUBLIC WORKS AGENCIES FACE HIGHER MONEY COSTS

Once material shortages begin to ease, local governments may find their long-delayed construction programs crimped by a different kind of scarcity: money. As a result, their interest costs will surely rise. But few projects will be dropped or postponed.

The pressure for higher rates isn't due to any absolute shortage of money. Most financial experts figure that the volume of lendable savings available for investment in the coming months will be large, by any standards.

But demand is expected to be much larger; it may even reach an all-time high. Just about every class of borrower will be clamoring for funds:

- Consumers are expected to increase the volume of instalment debt by another $1.5-billion—to $22-billion—before the year is out.

- Business firms will need large amounts for fall and Christmas inventory-building.

- The federal treasury is running a deficit and will have to borrow up to $4-billion by winter.

- Home buyers are expected to come back into the market in greater numbers once Regulation X is relaxed.

So states and municipalities would face keen competition for money even if they held down their planned public works to the current $5-billion-a-year level. In fact, though, local governments may boost works spending to as much as $10-billion.

- **One way to do it**—Of course, the Federal Reserve system could create enough money for all, simply by paying attractive prices for the government securities held by banks and institutional lenders. And, two years ago, FRB would probably have done just that.

But since that time, the FRB and the Treasury have come to an "agreement" to let the Reserve Board end its support of the government bond market. So the money market is pretty much on a normal supply-and-demand basis at the present time.

In this kind of free market, the highest bidder gets the goods. Therefore, to get anything like the amount of funds they would need, states and municipalities will have to offer more attractive rates of interest.

Local officials say they won't consider scrapping any large number of projects. It took too long to plan them and get them approved by the public.

- **No match**—Local governments won't have to match federal and other lenders, point for point, either. The tax-exempt feature they can offer on their bonds is still worth a lot.

But even tax-exempts will rise in order to maintain the normal differential in interest rates between exempt and non-exempt securities. Besides, the volume of tax-exempts which are shortly due to hit the market will serve to lessen their scarcity value.

Right now, the going rate for a good average-grade municipal bond is around 2.25%.

But it won't be long before local governments are paying 2.40%—or maybe 2½%.

Chicago—A truck load of fabricated Ryerson re-bars is delivered to the site of the 21 story Lake Shore-Briar Apartment Building, foreground. Construction is just beginning on this job while, in the background, the 22 story Darien Apartments, also built with Ryerson reinforcing, near completion. Contractor for the Darien Apartments is Sumner S. Sollitt Construction Co. The architects: Loebl, Schlossman & Bennett. For the Lake Shore-Briar Building (foreground) the general contractor is Crane Construction Co. and the concrete work is being done by Carl E. Erickson Co. The architect: Shaw Metz & Dolio.

Two More Big Jobs Rely on Ryerson Re-Bar Service

Contractors for these two ultra-modern apartment buildings —*and hundreds more builders from coast-to-coast*— take advantage of Ryerson construction steel service to help start jobs fast and stay on schedule.

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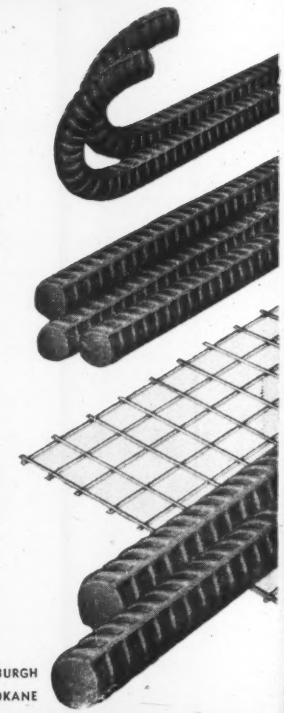

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- **Tarnish on Alaska aluminum**—Aluminum Co. of America's bright plan for a $700-million project in Alaska's Taiya Valley (ENR Aug 28, p. 21) got a bit dim. Canada—which controls the headwaters of the Yukon River—and the U. S. Department of Interior were applying the dimmer.

  Said Canadians: Alcoa's proposed dam near Whitehorse would be an obstacle to Yukon navigation; anyway, there's some question as to whether the national or provincial government has authority in the matter. Real reason: Canadians figure they got shoddy treatment when the U. S. refused a long-term procurement contract to Aluminum Co. of Canada for metal to be produced at the now-building Kemano development (which ENR will describe in its Sept. 25 issue).

  In the U. S., the initial block seemed to be an unenthusiastic Interior Department, which apparently meant to stick to the legal provision that no one company can own more than 160 acres of Alaskan land.

  Real block, however, is not Interior but Congress, which would have to approve special legislation to permit Alcoa to acquire land needed for its plant and for a town site to have a 20,000 eventual population. With politics very much in order, Congress has a ticklish point to decide: Should Big Aluminum get special concessions, after all the attacks on it—or might it be smart to let private capital go ahead and do the job at no expense to the U. S.? Many an observer thought that Alcoa's continuing flood of publicity on the project might have as an objective convincing Congress that the plan is a good idea.

  End result: Aluminum will come from Alaska, but it'll be a long time coming.

- **Not much for airports**—It's hard to see any effect in fiscal 1953 on federally aided airport construction, as a result of the President's call for action on airport safety.

  The Civil Aeronautics Authority got only $11 million last year—and has allocated all of that in small amounts throughout the program. Some of it is already being spent.

  The long-range effect will be most important, since the Doolittle Committee (on which Truman based his call) recommended building of future airports with parallel runways, formulating building restrictions in areas surrounding the ports, and other things. But it's difficult to peg exactly what these effects will be—at least until the order filters down to the agency level and is translated into directives.

- **Controls drop, but reports stay**—Although the last remnants of the Controlled Materials Plan are slated to fade by next spring, mobilization bosses are searching around for means of keeping up CMP reporting.

  Prime purpose of the reporting, of course, is to give controllers basic information for channelling metals where they are most needed. But the information itself has a lot of by-products the controllers think useful: It gives the armed forces information as to whether a new weapon will require new production facilities; gives detailed information on materials consumption by specific industries; might show how much metals production could be channelled into defense or war work without hurting the civilian economy.

- **Cutback**—Employers who want information on wages and salaries will have to contact regional offices (Atlanta, Boston, Chicago, Cleveland, Denver, New York, Philadelphia and San Francisco) for information henceforth. Wage and salary boards—showing effects of congressional cuts in budgets—have now closed some 100 local offices.

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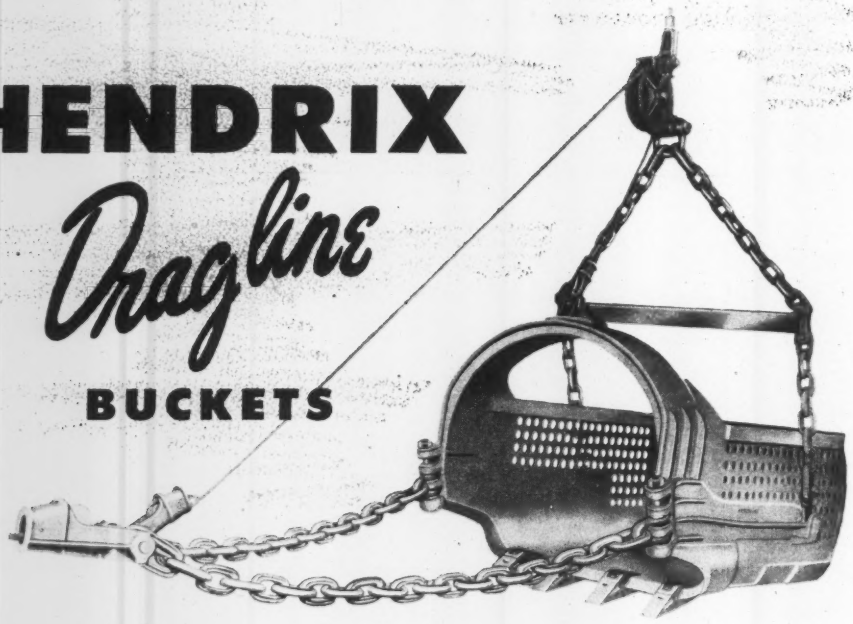

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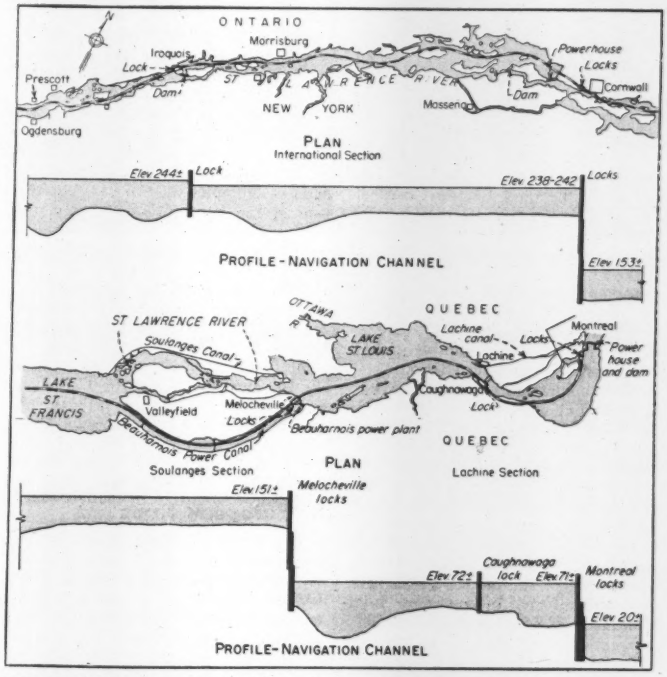


THE ST. LAWRENCE SEAWAY, under plans now being prepared by the Canadian government, will be located entirely on the Ontario side of the border in the International Rapids section (top). Earlier plans had placed it mostly on the New York side. No major change in location is planned for the Soulanges and Lachine sections.

Canada starts Seaway plan despite U.S. uncertainty

V. T. Boughton
Senior Associate Editor

Not deterred by the prospect of finding no agency on the U.S. side of the border with power to build the dams it must have for its "All-Canadian St. Lawrence Seaway," the Canadian government has made a new move to speed up preparation of plans for the project.

It has moved its Special Projects Branch of the Department of Transport from Ottawa to Montreal, and engaged R. A. C. Henry, Montreal consulting engineer, to direct the work of designing the structures for the proposed new ship canal.

In doing this, the Canadians were well aware that three U.S. entities—the U.S. Congress, the Federal Power Commission and the State of New York—hadn't yet resolved differences that can block the proposed $700-million job.

Guy A. Lindsay, former director of the Special Projects Branch, has been named special adviser to the Minister of Transport. In this capacity, Mr. Lindsay will be in charge of all matters relating to Canada's application to the International Joint Commission for permission to build the seaway and power projects, which application is now pending before the commission. A decision in this matter is not expected to be reached before November.

• **Existing ship canal**—At present there is an antiquated canal adequate only for ships of 14-ft draft extending from Montreal up the St. Lawrence River to Lake Ontario, a distance of 114 miles. There is considerable canal and river traffic at present. Its channel is partly in the river and partly in canals around the rapids. These canals have numerous small locks that will not permit vessels of over 3,000 tons capacity to pass.

This waterway is divided into five sections. The Lachine section bypasses the Lachine Rapids between Montreal and Lake St. Louis. The Soulanges section takes the waterway past the Soulanges Rapids up into Lake St. Francis. The Lake St. Francis section extends to the foot of the International Rapids near Cornwall, Ontario. These three sections lie wholly in Canada in the provinces of Quebec and Ontario.

Above that point the river forms the boundary between New York and Ontario. There the waterway is divided into the International Rapids section and the Thousand Islands section. The existing canal, having been built by Canada, lies wholly on the Ontario side.

Under the 1941 agreement between the two governments, which is still pending before the U.S. Senate, the United States was to share with Canada the cost of building a new canal in these two international sections of the river adequate for ships of 27-ft draft, which is the draft in the Welland Canal connecting Lake Ontario and Lake Erie. The two governments also were to share cost of building power facilities in the International Rapids section.

Engineering studies made at the time that agreement was being written indicated that the most desirable location for a ship canal along the international section would be on the New York side of the river in the northern counties of St. Lawrence and Jefferson (ENR May 21, 1941, p. 66). Consequently, the preliminary designs made at that time were for a canal on that side with a control dam and a main dam at about the same location as shown on the accompanying map. That plan also called for the power plants to be located on each side of the border in a dam across the north channel at the lower end of Barnhart Island, as shown on the map. Provision also was to be made for maintaining the

ESTIMATED COST OF ST. LAWRENCE SEAWAY

(December 1950 prices)

Lachine Section	$ 98,229,000
Soulanges Section	37,116,000
Lake St. Francis Section	2,153,000
International Rapids Section	508,600,000
Thousand Islands Section	1,593,000
Deepening Welland Canal	1,302,000
	$649,353,000

present 14-ft canal on the Canadian side.

• **New all-Canadian canal**—Under the plans now being prepared for building a new ship canal as an all-Canadian project, no major changes will be made in the Thousand Islands section. Only channel widening is required there.

In the International Rapids section, no change is to be made in the location of the dams and the international power houses, but locks, navigation channels and canals to the locks all will be located on the Ontario side of the river. The present 14-ft canal will be maintained only until the new facilities are available.

In Canada's current application to the International Joint Commission for authority to build the seaway, that country agrees to build a new ship canal in both the Soulanges and the Lachine sections of the river. In the Soulanges section, about all that is required is construction of a flight of two twin locks near the Beauharnois power plant. The canal to that plant was designed to serve as a navigation canal when needed.

No decision has been reached as to whether the Lachine section will be improved for navigation alone, or whether power and navigation will be combined. If the latter, a power dam is proposed near the Victoria Bridge at Montreal. Navigation would require a guard lock and two lift locks near the dam.

• **Power plan changed**—In the cost allocations worked out for the 1941 agreement the cost of dams in the International Rapids section serving both power and navigation was apportioned between the two services. If Canada is authorized to build the seaway, the entire cost of these structures is to be charged to power under an agreement between the Canadian government and the Hydro Electric Power Commission of Ontario, which provides that the commission will pay all power costs on the Canadian side.

What agency will build the power facilities on the United States side is yet to be determined. During the drafting of the 1941 agreement it was assumed that all the navigation and power facilities on the New York side would be built by the Corps of Engineers, U. S. Army, which had made the plans and cost estimates. More recently, after repeated failures of the U. S. Senate to ratify the 1941 agreement, the Power Authority of the State of New York applied to the Federal Power Commission for authority to build the power project jointly with the Ontario Hydro.

That application was denied late in 1950, but within recent weeks the FPC has announced that it will reconsider New York's application.

When the FPC turned down New York's application it did so on the ground that Congress should decide what U. S. agency should participate in the project. It could still reach the same conclusion—thus preventing an actual start of the project by Canada, even though the International Joint Commission should approve Canada's application for authority to proceed with the project. On the other hand, the FPC may accept President Truman's endorsement of the all-Canadian project as authority for it to approve New York's application.

At a hearing on the power features of the St. Lawrence project held by the International Joint Commission in Albany, N. Y., Sept. 3, John E. Burton, chairman of the Power Authority of the State of New York, told the commission that the New York authority was the only public body authorized to construct the hydroelectric power plant on the U. S. side of the border, needing only the approval of the IJC and the Federal Power Commission.

• **Power potentials**—Roughly, 2.2 million hp can be developed in the International Rapids section of the river, half of which will go to each country. In the Soulanges and Lachine sections, private power companies have developed part of the head for many years. Overall development of the total head in the Soulanges section was begun in 1930 through the construction of the Beauharnois canal and power plant. At present, about one million hp is being developed at Beauharnois and turbines to add 400,000 hp are being installed.

That plant can be expanded to two million hp.

Overall development of the full head in the Lachine Rapids by a dam at Montreal, as shown on the map, would produce 1.2 million hp.

• **Cost estimates**—Estimates of the cost of the entire project, made at the time the 1941 agreement was signed, placed the total at $349 million of which $218 million was to be allocated to the United States and $130 million to Canada. The difference in amounts was due to recognition of the large investment Canada had made in the Welland Canal, which forms part of the seaway project.

The most recent cost estimates are those of the Canadian Department of Transport, which are based on December, 1950, prices. They put the total costs at $649 million. Under the agreement between the Canadian government and Ontario Hydro, all but $246 million of this would be charged to power.

Seaway contracts sought by European firms

While the definite start of the St. Lawrence River Seaway is still awaiting decision of the International Joint Commission, British and European engineering and electrical power manufacturing firms already are closely investigating how they might get a share in the building of the all-Canadian seaway and the Canadian end of the accompanying power development.

The Export Group of Construction Industries of Great Britain is looking into the possibility of buying into or buying outright a number of Canadian construction companies as an essential step to obtaining a large part of the construction business involved in the $500,000,000 project, according to the authoritative Toronto "Financial Post." The Federation of British Industries is also understood to be working along similar lines, and the British government is believed to be backing these industry moves which would result in more Canadian dollars for Britain's international trade.

In addition, some Dutch, German and Italian engineering firms and manufacturers of electric power equipment have had delegations in Canada recently, and consulted the Ontario Hydro-Electric Power Commission on various phases of the seaway.

In informed circles it is believed the Canadian government would like to see some of the construction and machinery come from across the ocean.

WARREN—His stern ruling on overcommitters inspires . . .

ENGLE—To demand laws for even sterner treatment.

Overspending gage sought

The man chiefly responsible for Comptroller-General Lindsay Warren's ruling that federal agencies violate the law (ENR Sept. 4, p. 72) when they overcommit congressional authorizations, wants an even bigger club to hold over the spending agencies.

Rep. Clair Engle, chairman of the House Interior Subcommittee that asked for the ruling, is preparing legislation designed to provide Congress with that bigger club.

Engle thinks that the comptroller-general's ruling is a good start, but he doesn't think it will prevent an agency from committing as much of an authorization as it wants to on a single portion of a project. He pointed out that in the Eklutna hydroelectric project, on which Warren's opinion was based, the Bureau of Reclamation committed $17.5 million of its $20.3-million authorization for a four-mile tunnel through Goat Mountain.

"When they let the tunnel contract, they knew they were going over their authorization, but I guess they thought we would bail them out. Under the legislation I will introduce, the agency would be required to come back to the committee for approval before letting a contract for a portion of a project that is out of line with estimates on which authorization for the project was based."

Engle pointed out that now, even with the comptroller-general's ruling, Congress is put in the distasteful position of either having to grant an increased authorization for a project or to kill the project by refusing to up the authorizations."

What happens in such a situation is that the authorization generally is raised. "What we want," says Engle, "is a practical control whereby we can prevent the agency from making commitments that will put them over the authorizations."

Engle is aware that the spending limitations Congress might slap on could well bog down construction operations in bureaucratic red tape. "I certainly don't want to straitjacket the agencies," says Engle, "but I think legislation can be drafted that will give us the results we want without unduly hampering the agencies in their operations."

• **Percentage yardstick**—Engle isn't quite sure what kind of a yardstick to use to determine when the agency must come back to the committee for approval before going ahead on a project at increased costs. But he thinks something in the way of a percentage yardstick might be used so that when a contract is about to be let is, say, 30% above original estimates, the agency must get committee approval. That, thinks Engle, would enable Congress to hold project spending close to the amount of the estimates that had originally been given.

Such control over spending would give authorizing committees such as Interior, Public Works, and Agriculture new stature on the Hill. Previously, when authorizing committees handed out only open-ended authorizations, the agencies found that the only Hill groups they had to worry about were the appropriations committees; but legislation such as Engle has in mind will force executive agencies to spend as much time cultivating authorizing committees as they now devote to the various appropriations groups.

Ferguson Co. fined for overpayments

The Regional Wage Stabilization Board in Cleveland last week announced that the Regional Enforcement Commission returned a $15,000 tax disallowance finding against the H. K. Ferguson Co., Inc., of Cleveland, for illegal excess wage payments (ENR May 22, p. 32).

The overpayments were to 84 bricklayers employed by the company in 1951 on construction of an addition to the National Cash Register Co. in Dayton, Ohio.

Ferguson paid $4 a day board and room allowance to bricklayers who were imported into Dayton during construction of the defense plant's addition.

R. L. Cashen, vice-president for operations of the Ferguson Company, reported that the firm is studying the commission's decision to determine if an appeal should be made.

• **Company's side**—In discussing the decision, Cashen said:

"In its decision the commission has at least recognized officially that the wage situation for bricklayers in the Dayton area was confused at the time we began work early in 1951, and that this confusion made it difficult for us to determine what rate should be paid.

"The government also has conceded that we were faced with the dilemma of an acute local bricklayer shortage on one hand and our obligation, on the other hand, to complete without delay an urgently needed defense facility.

"We are gratified that the government in this decision, for the first time to our knowledge, officially recognizes the almost impossible position which confronted construction contractors during the early days of wage stabilization, due to confusing regulations.

"In our case, the project starting date, March 8, 1951, was the very date on which General Wage Regulation No 9—which we are accused of violating—was issued by WSB."

Government figures showed that the prevailing rate, at that time, for the Dayton area, was $2.75 and after June 4, 1951 it was raised to $2.89, with no provision for payment of subsistence or its equivalent.

The Ferguson Company argued that payment of subsistence to bricklayers brought in from outside the area would not normally appear in a local labor agreement.

However, the commission did not regard his testimony as sufficient proof of any prevailing practice.

Forecast tight GI housing supervision

Home builders will have a new set of rules to live with if the Teague committee is successful in translating into law recommendations based on its investigation of the loan guaranty program under the GI bill.

The top objective of Chairman Olin Teague is authority for the Veterans Administration to supervise contractual relations between sellers and veteran-buyers.

The fact that the building industry is opposed to injecting VA into its relations with GI buyers and that VA itself is cool to such a proposal hasn't deterred Teague. He'll have his legislation ready when Congress meets in January. But it will run into plenty of opposition and it is doubtful that it will come out in anything like the form that Teague and his committee hoped for.

• **Why bring in VA?**—The reason for bringing VA into the contractual picture, said Teague, is to insure a sales contract with protective features for the buyer that just don't exist in the customary "seller's contracts."

Teague won't hold out for a standard contract form to be used throughout the country in connection with VA guaranteed loans, but he'll press for requiring inclusion of a half dozen or more protective provisions.

The committee report, released last week, contained selected answers to a questionnaire sent to 67 regional VA loan guaranty officers. The overwhelming reaction of opinions quoted was in favor of a standard type of contract form or one that would provide essentially the same protective provisions sought by Teague.

• **VA unhappy**—On the other hand, T. B. King, director of VA's loan guaranty service, saw pitfalls in bringing VA into the contractual picture. He thought it might cause a lot of builders out of the VA program, and even antagonize veterans, in some cases, where VA refused to approve a sales contract that was acceptable to both buyer and seller.

King pointed out that a lot of criticism of VA is a result of actions taken in response to pressure from veterans, either directly or through their congressmen, in an effort to get postwar housing almost at any price and on any terms. King also feared that bringing VA into a contractual set-up would force the agency to provide legal service in the veteran's behalf to back up the contracts.

Oliver Meadows, staff director of the committee, didn't see it quite that way. "What we have in mind in this proposed legislation," he said, "is not free VA legal representation for the veteran-buyer, but a better contract for the veteran to initiate legal action on his own, if he so desires. With the type of contracts now in use, the builder can represent one thing to VA in getting his construction loan and then not have to live up to those representations in the contract he gets the veteran to sign."

"What we want is this: The builder must tell the buyer the same things he tells VA. By bringing VA into the contractual relationship, we think that result can be achieved," Meadows reported.

• **Promotes warranties**—As it now stands, there's little the buyer can do in case of, say, a wet basement, or other defects, unless the builder chooses to make good. With warranties spelled out in the contract, the buyer then is armed with a strong legal weapon. Actually, builders groups like the National Home Builders Assn. are advocating such a voluntary warranty for their members.

What Teague wants in VA loan regulations

Here are the protective features that the Teague committee wants incorporated in all sales contracts on housing purchases under the GI loan guarantee program:

1. Description of property, incorporating by reference the plans and specifications on file with the VA.

2. A provision that veteran-buyer will be notified of any major substitutions, deviations, or alterations in plans.

3. Specific details of closing costs.

4. Specific language guaranteeing performance by the builder including a performance date, if necessary.

5. Details of agreement between seller and purchaser regarding sidewalks, curbs, streets and sewers.

6. A specific statement that dwelling will be built in accord with plans and specifications on file with VA and any changes therefrom must be okayed by the VA, the builder, and the purchaser.

7. A specific statement that the dwelling will be erected in accord with the minimum construction requirements of the VA.

8. Specific provisions relating to any guarantee or warranty made by the builder, such as guarantees of heating, plumbing, and electrical fixtures and guarantees for dry basements.

Meadows wasn't worried about the possibility of driving builders out of the program. "There are some that ought to be driven out," he said, "but I maintain that the reputable builder will stay because he has no place to go. After all, veterans housing has provided the backbone of postwar construction—2,800,000 homes built under VA-guaranteed loans since the war."

• **Background**—The report covered hearings that the committee had conducted in San Diego (where several builders, lenders, and VA officials are under indictment) and in Washington, D. C. The committee concluded that the practice of VA granting price increases to Washington area builders had resulted in inflating housing prices in that area.

Findings in the report also were based on information provided by the inspection-investigation service of VA which conducted investigations of VA practices in 26 cities.

A survey of 67 regional loan guaranty officers, included in the report, showed them almost unanimously in favor of the fee appraisal system in preference to appraisals by staff men. King concurred in this, pointing out that the use of building industry men for appraisal work provides a more flexible system, which can be readily expanded or contracted to fit the work load.

It also provides a higher caliber inspection, King pointed out, than can be had through inspection by staff men who will work for salaries the VA offers. Also, incompetent fee inspectors can be dropped readily, while it is almost impossible to fire a staff inspector.

GI home loan inquiry underway in Detroit

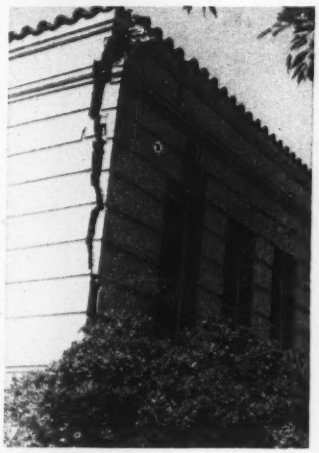
A full-scale investigation was launched into the handling of GI loans in Detroit following suspension of licenses of three home-building firms for alleged VA bribery. Philip A. Hart, U.S. attorney in Detroit, said his inquiry would include the whole scope of the GI loan and mortgage procedure.

Suspension of the three licenses had been preceded in recent months by dismissal of 11 VA inspectors, suspension of a fourth builder's license, and numerous charges of bribe-taking and bribe giving. Bribes, often in the form of bonuses, were invariably added to the price paid by the home buyer.

The three firms whose licenses were revoked were: Townsite Homes, Inc., the Mid-State Construction Co., and the Lakeside Building Co.

If earthquake-proof design had been used on . . .

building parapets . . .



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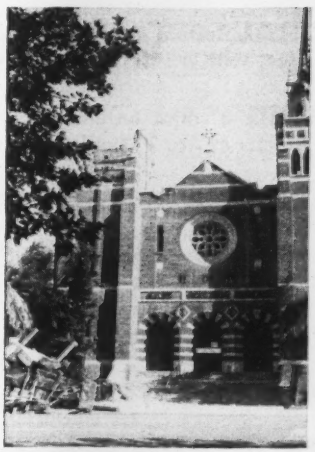

church steeples . . .

. . . the business section of Bakersfield, Calif., would not have had to be roped off for a week, two deaths and 20 serious injuries might have been avoided and a considerable part of $20 million in damages averted.

The Aug. 22 quake, which exacted this toll, was catalogued as an aftershock of the July 21 Tehachapi earthquake by seismologists who rated its severity as 6 compared with the original shock's 7.5. But it was severe enough to bring recommendations that many public buildings be abandoned completely and replaced with seismic-resistant construction for which the 5% extra cost would be bargain insurance.

The buildings shown all were substantially built structures, but the design of each violated at least one of the rules that have been developed to make such buildings less susceptible to earthquake damage.

NEWS BRIEFS

• **Atomic turmoil**—Pike County, Ohio and surrounding areas teemed with construction plans last week as federal, state and private organizations discussed facilities expansions to meet the needs of thousands of workers who will be employed at the Portsmouth U-235 plant. The Federal Housing Authority is surveying the area to determine needs for new housing units, and the Ohio Council of Churches hopes to provide a spiritual program for the thousands of construction workers needed on the project. A four-lane superhighway from Portsmouth to Chillicothe is being planned and the state highway department earmarked $600,000 for bridge improvement—to include two new bridges and the rebuilding of eight others.

• **Bridge battle**—Words—but little else—flew in New Orleans as the dock board and the state highway department argued plans for the proposed bridge to span the Mississippi at Louisiana's largest city. "Suspension," demanded the dock board, in an ultimatum issued to the highway department. "Cantilever," countered state highway officials.

Highway people favor a cantilever bridge—estimated to cost $29.1 million—principally because it would be easier to finance. The dock board, however, wants a suspension type—expected to cost nearly $60 million—because it would eliminate need for piers in the river. Further, the dock board will refuse approval of the new bridge until vertical clearance is raised from 135 ft to 175 ft at high water stage.

• **Win by-pass fight**—After 14 years of argument, the Delaware State Highway Department last week announced plans for a $1.3-million by-pass around Hockessin, Del. First stage in the by-pass—an important link in the Delaware Memorial Bridge-Western Pennsylvania route—will be a grading and drainage project on a 2.7-mi concrete road to skirt Hockessin.

• **Anti-pollution deadlines set**—Sixty-one municipalities and industries in Wisconsin received deadlines late last month to provide anti-pollution facilities on the Milwaukee and Black Rivers and their tributaries. Dates were fixed in orders issued August 20 by the Wisconsin State Board of Health and the State Committee on Water Pollution.

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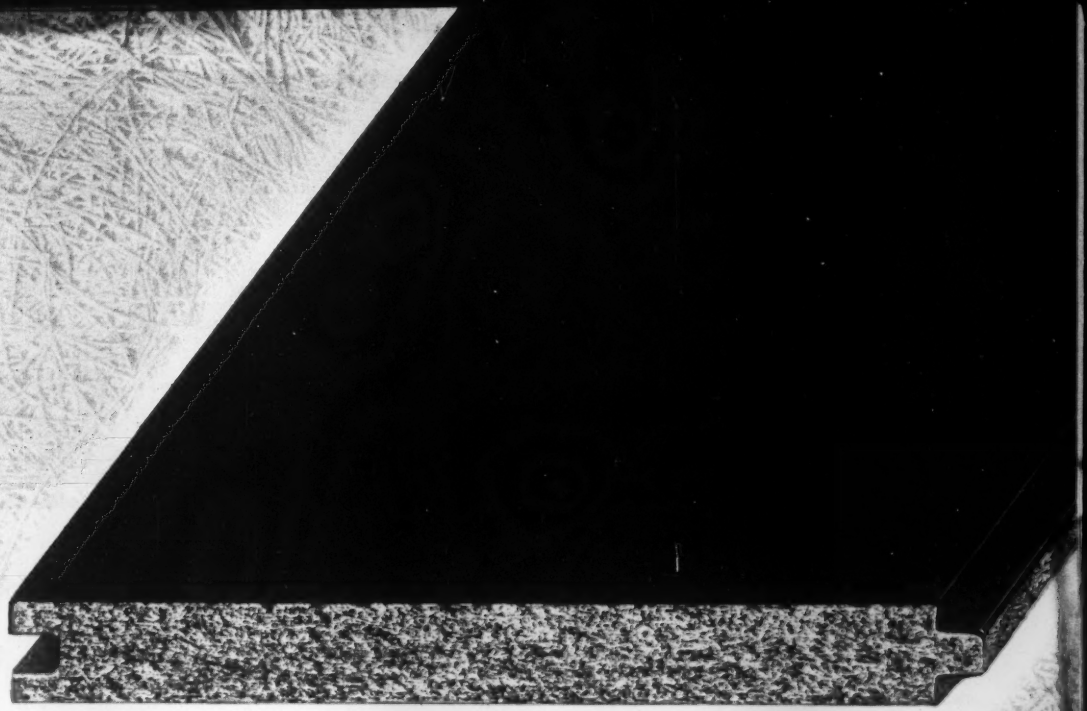

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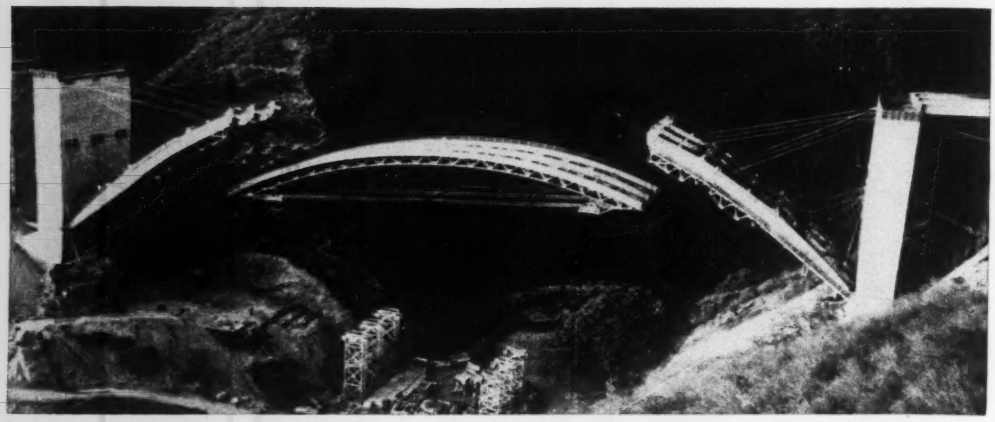


GOING UP—Formwork for central sections of arch ribs, 265 ft long, 70 ft wide and weighing 240 tons, is hoisted 220 ft above canyon floor. In place, the timber truss formwork and partly concreted adjacent rib sections acted as an arch.

Spectacular Venezuelan concrete arch bridge

ONE OF THE BOLDEST engineering feats in recent years has been accomplished in the rugged mountains surrounding Caracas in northern Venezuela.

An open-spandrel two-hinged concrete arch spanning 498 ft and 220 ft above a canyon floor, was cast on forms suspended by cables from the abutment piers. Its hollow arch ribs and slender, flexible spandrel columns are prestressed, while deck beams and slabs, and cross beams, are both precast and prestressed. The whole assembly is literally tied together with prestressing cables.

The concrete arch span, longest in the western hemisphere and fifth longest in the world, is part of a 1,013-ft highway bridge. Cost of this bridge plus two others quite similar (830 and 700 ft long, with main spans of 476 and 453 ft) will come to only $5½ million.

The new four-lane road, when completed late in 1953, will serve as a lifeline between the port city of La Guaira and the capital, Caracas, only 10 miles apart but separated by the massive 6,000-ft coastal range. So difficult is the going that the entire project, including two tunnels 5,820 and 1,510 ft long, will cost about $70 million.

• **Design**—Eugene Freyssinet, French engineer, conceived the unique arch structures. His guiding design principle was to use identical elements and erection methods for similar parts of the three bridges, even though there were slight dimensional differences.

Corresponding deck beams and slabs, cross beams and spandrel columns for all bridges are exactly the same in cross-section. Variations in span are corrected simply by adding or removing panels of special steel forms.

Although main spans vary as much as 45 ft, cross-sections of the arch ribs are identical. They will be cast in the same forms modified as needed by addition or deduction of an element to make up for variations in span.

Since all the bridges are quite similar, only the one that is almost finished will be considered in this article.

Longitudinal dimensions are given in Dwg. 1. The deck is 70 ft wide and provides six traffic lanes, three on each side of a 4-ft wide mall. Concrete surfacing is 2 in. thick at the edges and 7½ in. at the center, the resulting 1.5% slope being quite adequate for drainage. Sidewalks, 2 ft 4 in. wide, are hollow to house utility lines.

The bridge was designed for AASHO H-20 loading. All high-tensile steel used for prestressing had an ultimate strength of 260,000 psi and a final working stress of 120,000 psi. Since 0.2-in.-dia wires were employed in either 12- or 18-wire cables, final tensions in the prestressed cables were 45,000 lb and 68,000 lb, respectively. Concrete varying from 3,300 to 4,000 psi was required.

A fairly high figure of 50 psf was used for transverse wind load because of the absence of reliable data.

• **Deck**—The bridge floor consists of precast slabs set between precast, prestressed longitudinal deck beams. These beams, in turn, span between cross beams atop the columns.

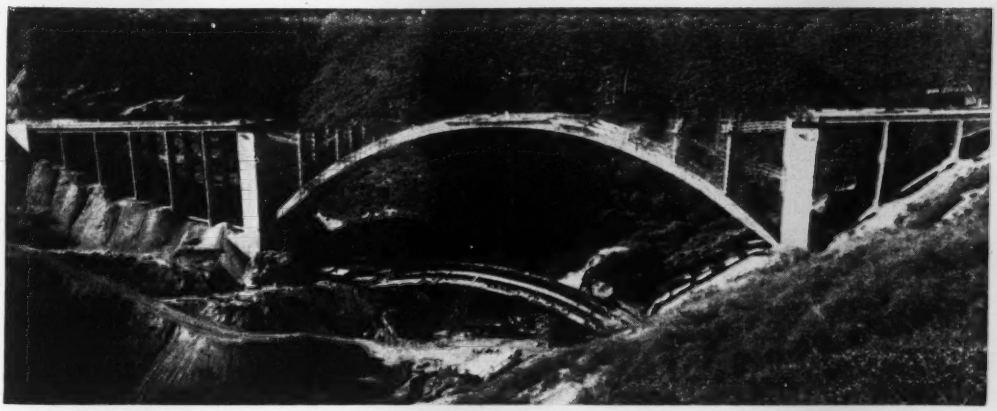
A typical panel contains eight stringers on 9-ft 2-in. centers, as shown in Dwg. 2. These beams are 5 ft 11 in. deep. Webs are 5½ in. thick except for a length of 4 ft at each end, where they haunch out to 16 in., the thickness of the bottom flange.

The beams are prestressed with three or four 12-strand cables (depending on beam length) and are anchored at both ends with Freyssinet-type cones. Mild steel reinforcing is nominal, consisting of stirrups and a few longitudinal bars.

The precast slabs forming the deck are 5 ft 3 in. long, 3 ft wide and 7 in. thick. Theoretically, they require no reinforcing, since after the 120 elements of a 48-ft panel (8 beams and 112 slabs) are placed, they are tied together transversely by tensioning cables spaced 3 ft apart. These cables, of eighteen 0.2-in. wires, pass through holes in the top flanges of the beam and rest in U-shape grooves formed in the slabs.

The deck is designed as three separate continuous systems: One for the main arch span between the main abutment piers and one for each of the approach viaducts. After all beams, slabs and cross beams of one system were placed, grouted, and prestressed transversely, they were made to act as a continuous beam by longitudinal prestressing. Four or six 18-wire cables (four in the approaches, six over the arch) were placed in grooves in beam tops and tensioned.

• **Cross beams**—The cross beams serve primarily to stiffen the deck transversely, but also support the two deck



BACK ON GROUND—All formwork was lowered before column concreting began, leaving an arch of hinge-connected rib sections (7 hinges in all). Thus, pouring and placement of precast deck elements had to be exactly symmetrical on each side of the crown.

beams which are not carried directly by the spandrel columns. Each was partly precast, partly cast in place. The top portion was cast in place between the ends of the stringers and is 8 in. thick and 5 ft 11 in. deep. The bottom—an inverted T-shape section—was precast in five separate elements. The web is 8 in. thick; the bottom flange tapers to a width of 2 ft 8 in. Total depth is 9 ft 2 in.

The precast elements were assembled by prestressing. After the deck was prestressed longitudinally, as mentioned above, the cross beams became part of the deck, working with it under live load and wind load.

• **Prestressed columns**—Shaped as elongated I-sections, all spandrel columns measure 10 ft 6 in. crosswise to the bridge and have 5½-in. webs. Flange widths vary slightly, from 2 ft 8 in. in the approach viaducts to 2 ft over the arch, for the sake of appearance.

Columns were cast in place and then prestressed vertically. Those adjacent to the ends of the bridge and at the crown are hinged at the top since they are quite short and would be subject to large bending moments due to longitudinal movement of the deck if fixed. The rest of the columns are rigidly connected to the cross beams by prestressing cables. Columns in the approach viaducts are hinged at the bottom, resting on precast hinge blocks.

The portal effect due to the fixation of column heads to the deck was ignored in the design because the deck is 30 times stiffer than the extremely slender and flexible columns.

• **Piers**—Rising above each arch abutment is a massive-looking pier, 137 ft high, 80 ft wide and 20 ft thick. Actually, they are hollow shells given a rugged appearance for esthetic purpose. In addition to receiving wind stresses from the arch span, these piers serve as supports for the arch rib forms and for parts of the ribs themselves during construction.

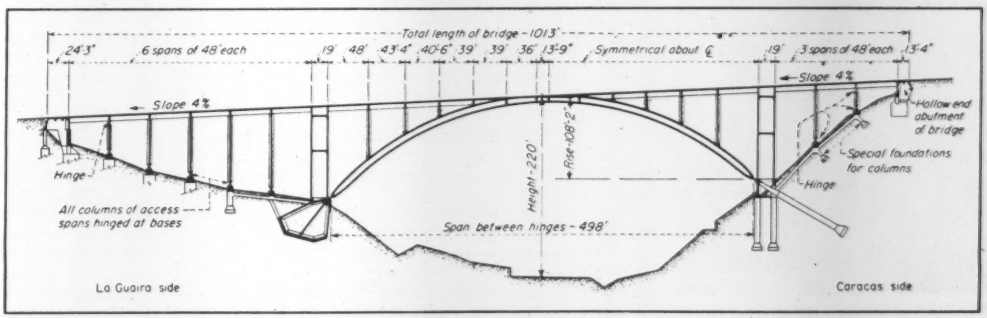
The 80x20-ft cross-section is divided into four 20x20-ft cells, each stiffened by horizontal concrete slabs at half height and at the top. The 4½-in. thick vertical walls and partitions are considered as continuous slabs, so that mild steel reinforcing is very light.

The columns are cast in place and prestressed with ten 18-wire cables, one in each corner of the cells. Atop each column is a concrete rocker, which allows longitudinal movement of the deck.

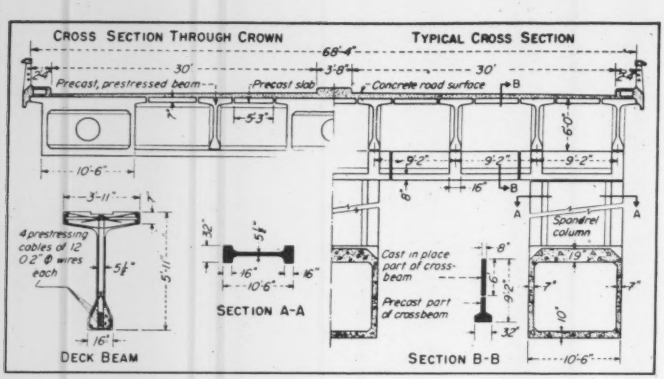
• **Arch ribs**—Since live load bending moments are more or less equal in absolute value and relatively small compared to dead load influences, the design objective was an arch whose neutral axis would be as close as possible to the funicular curve of the dead load. This curve is not smooth, of course, but a series of individual arcs meeting at points located at the bases of the spandrel columns.

The design objective was achieved, except near the crown zone. Here, to facilitate transmission of transverse wind forces to the deck, the neutral axis was raised as high as possible. As a result tensions were admitted to the lower member of the arch in this zone—which were counteracted by prestressing.

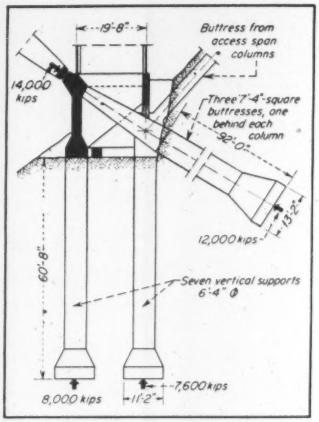
The intrados of the arch is a smooth



DWG. 1—LONGITUDINAL SECTION. Note column foundations employed on Caracas side because of decomposed schists.



DWG. 2—CROSS-SECTIONS through arch, deck beam, cross beam and column.



DWG. 3—SPECIAL ABUTMENT on Caracas side was required because decomposed scists obviated open excavation.

curve, whereas the extrados is formed by straight lines connecting column bases. But to improve appearance the extrados line is chamfered. The 498-ft two hinged arch has a theoretical rise of 108 ft 2 in.

As indicated in Dwg. 2, the arch consists of three parallel ribs 27 ft 6 in. on centers. Each is a hollow box, a shape that provides great resistance to vertical and transverse bending moments. The ribs are 10 ft 6 in. wide except at the springing line, where the width is increased to 17 ft for increased transverse stability. There is no bracing between ribs, except in the crown zone where ribs and deck join into one system.

Because the erection procedure dictated that rib bottoms be carried by very light falsework (afterward working with the falsework to support later stages of construction) they were designed as thin as possible. The bottoms are 10 in. thick compared to 19 in. for the tops. Webs are 7 in. thick.

Depth of ribs varies from 12 in. at the end hinges to a maximum of 10 ft and then reduces to 6 ft 6 in. at the crown. Mild-steel reinforcing is very light, about 85 lb per cu yd of concrete. One of its functions is to provide shear resistance in the rib webs during construction.

• **Arch abutments**—The ribs are subject to a 14,000-kip inclined end reaction, which is transmitted to abutments through a precast hinge block weighing 13 tons and measuring 12 in. across its narrowest point.

On the La Guaira side, the abutment is hollow and irregularly shaped. It is prestressed in three directions (one transverse); only a small amount of mild-steel reinforcing is used.

On the Caracas side, decomposed schists made a large open excavation impossible. Instead, a series of vertical wells and inclined tunnels was hand dug to accommodate a special open-type abutment (see Dwg. 3). It consists of seven vertical concrete supports 6 ft 4 in. in diameter and 62½ ft deep, and three inclined buttresses 7 ft 3 in. square and 100 ft long, one behind each rib. Reactions from columns in the approach viaduct are also carried to this abutment through inclined concrete members lying near the ground surface so that excavation at the column bases could be reduced (see Dwg. 1).

• **Expansion and contraction**—The maximum temperature variation designed for is ±30 F, which is very much on the safe side. The fixed point of the central span deck is at the crown of the arch. Spandrel columns except for the short ones next to the crown are fixed to the deck; their flexibility in the longitudinal direction can take care of the expected small movements.

The deck is supported at the piers on concrete rockers that allow longitudinal movement, but provide complete transverse stiffness.

On the approach spans, expansion and contraction are provided for by flexibility of the columns, fixed at top and hinged at the base. But again, because they are very short, the columns nearest the ends of the bridge are also hinged at the top to avoid bending moments. The deck is supported on concrete rockers over the end abutments and is fixed at the arch abutment pier.

• **Wind forces**—Wind loads on the approach spans are taken by a series of transverse frames formed by the columns, cross beams and deck. One part of the wind load is transmitted to precast hinge blocks at the column bases; which are considered fixed in the transverse direction. The other part is taken by the deck, acting as a 70-ft wide beam, to the end abutments and piers.

THE MAN WHO BUILT THE BRIDGE

ROBERT SHAMA: "It was 265 feet long and had to fit exactly."

One of this country's leading bridge engineers looked at a photo of the central section formwork going up, published recently in many newspapers, and exclaimed, "This is one of the most amazing and spectacular erection jobs that has ever come to my attention. But it seems to me that if the builder knew enough about the behavior of such a structure he would not dare to undertake it. Yet if he didn't know his business exceptionally well he couldn't complete it!"

The man thus complimented both for his courage and astuteness is Robert Shama, the zestful British-born French-trained engineer in charge of building the Venezuelan arches. He deserves credit along with Eugene Freyssinet, the designer.

Part of the wind load on the arch itself is carried directly to the abutments through the ribs, while the rest is transmitted to the deck at the junction of ribs and deck at the crown and through the columns, which are quite stiff transversely.

The deck in turn acts as a 70-ft deep 504-ft long beam in transmitting wind forces through the rockers to the piers.

• **Construction**—Foundations for this bridge were started Mar. 30, 1951, and the last deck slab will go into place this month. About the only normal aspect of construction was the sequence: Abutments and approach column foundations, approach columns, deck over the approach, arch ribs, spandrel columns and arch-span deck.

Concrete for the abutments, as well as for the entire job, contained about 7½ sacks of cement per cu yd. It tested above 5,000 psi. The water-cement ratio varied from 0.4 to 0.43, yielding a fairly stiff mix.

• **Approach spans**—Precast hinge blocks for the columns were placed from a 5½-ton cableway spanning the site. The thin columns were cast in place in 5-ft lifts, leapfrogging custom-built steel forms.

During construction, horizontal timber bracing at 30-ft intervals tied each column to the preceding one and so on back to the end abutment.

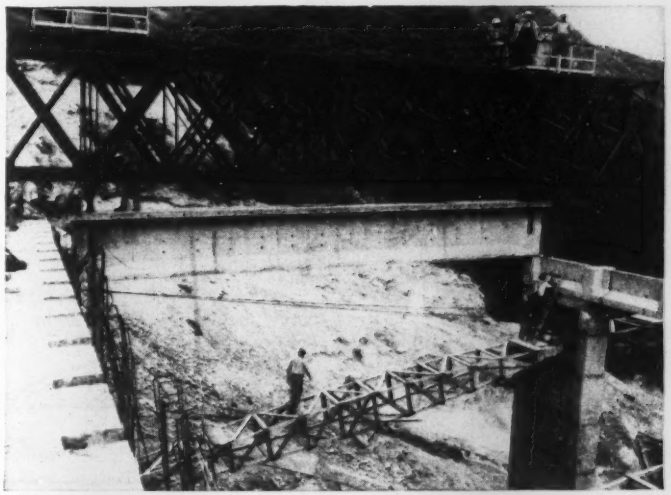
The same leapfrog formwork method was employed for the arch piers. For stabilization during erection, they were tied to the end abutments. Concrete was placed from 1½-cu yd buckets suspended from the cableway.

Three of the five precast cross beam pieces were placed atop the columns first, then the last two were set in-between. Joints were grouted; then the precast units were prestressed with four 18-wire cables.

Deck beams and slabs for one span at a time, starting at the end abutments, were placed by a gantry crane that cantilevered 60 ft in the direction of the bridge. About ten days were required to set the 8 beams and 112 slabs for one span. Grouting of joints and transverse prestressing followed immediately.

When all the approach spans were completed, top parts of the cross beams were cast. Finally the decks in the three- and six-panel approach viaducts were transposed into continuous systems by longitudinal prestressing, cables being set in U-shaped grooves in beam tops.

• **Precasting yard**—Precision precasting of deck beams and slabs, and the cross beams contributed greatly to the success of the undertaking. There were yards on each side of the gorge.



GANTRY CRANE cantilevering 60 ft places precast prestressed deck beams atop precast portion of cross beam. Note hinge block at top of spandrel column.

Deck beams were precast in 13-ton steel molds, made heavy because they were not to deflect during the 100 re-uses expected of them for the three bridges. Eight 1½-kw vibrators were placed along the bottom, fourteen 800-v units along both sides—all units vibrating at 3,000 cycles per minute.

Forms were removed the day after pouring and on the fourth day the beams were prestressed. The heaviest beam weighed 27½ tons.

Slabs, weighing about 1,100 lb each, were turned out 24 a day. They were internally vibrated at 100 cycles per minute.

Since it was desired to place the 13-ton arch rib hinges from the 5½-ton cableway, each hinge was precast in four 3¼-ton pieces. When all were in place, the 1½-in. joints between them were grouted, then four 18-wire cables tied the pieces together.

• **Arch erection**—With any concrete arch, supporting the forms is the main problem. When the requirement is for a rise of 220 ft above the ground and a span of 498 ft the problem is challenging in the extreme.

Before going ahead with his daring idea of suspending the forms from the piers, Freyssinet considered building two timber trusses in a nearly upright position at the hinge points and swinging them down to a juncture, much in the manner of double-leaf bascule construction and operation. It was feasible, but the trusses would have been exceedingly deep and would have required 5½ times as much timber as the adopted system.

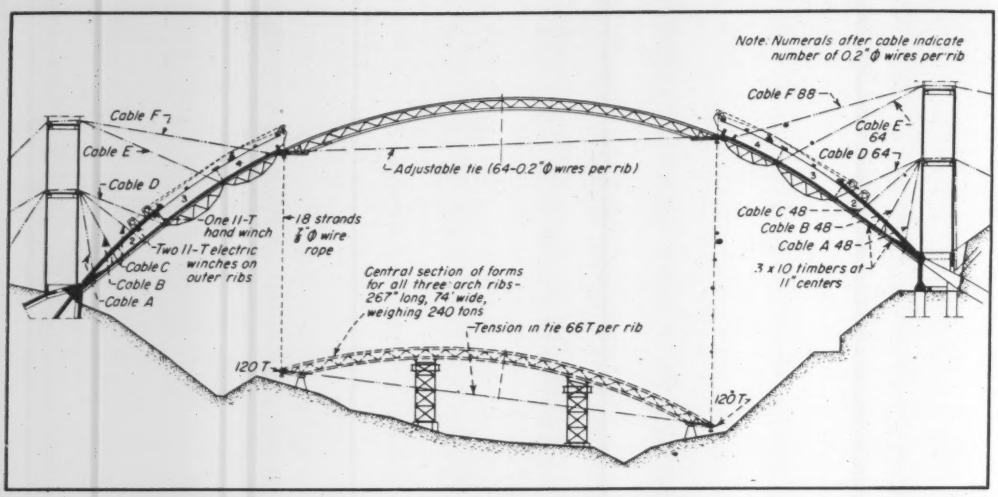
Drawing 4 outlines the procedure used. The first formwork element for each rib starting from the hinge was assembled just off one of the approach spans and placed with the 5½-ton cableway. Composed of a platform carried on 3x10-in. timbers on 11-in. centers, it weighed just 5½ tons and was about 30 ft long.

Each platform was suspended on two sets of cables (A and B) anchored in the abutment pier, each set being made up of a total of 48 0.2-in. wires. The outer ends of the cables were embedded in concrete cast around a transverse steel beam on which the platform rested.

The bottom of the arch rib was poured first and worked together with the timber platform in supporting the sides and top of the rib as they were poured. Transverse bracing was placed between the ribs during construction.

The falsework platform for the second length of rib was exactly the same as number one and was also placed similarly and supported by two more sets of cables (C and D), one of 48 wires the other of 64. Again the entire rib was cast. Only the bottoms of the rib sections actually abutted—a very small gap being left at the sides and top. In this manner a temporary hinge was provided so that the rib could be adjusted to its final curve.

The third form section for each rib was supported on a timber truss about 50 ft long, weighing 11 tons. Too heavy for the cableway, it was assembled in the valley below. A hand winch was set up on the first rib section, and with it and the cableway each taking 5½ tons, the truss was hoisted neatly into position and held


Note: Numerals after cable indicate number of 0.2" Φ wires per rib
Cable F
Cable E
Cable D
Cable C
Cable B
Cable A
One 11-T hand winch
Two 11-T electric winches on outer ribs
18 strands 1" Φ wire rope
Adjustable tie (64-0.2" Φ wires per rib)
Central section of forms for all three arch ribs - 267' long, 74' wide, weighing 240 tons
Tension in tie 66 T per rib
120 T
120 T
Cable F 88
Cable E 64
Cable D 64
Cable C 48
Cable B 48
Cable A 48
3 x 10 timbers at 11" centers

DWG. 4—ERECTION OF CENTRAL SECTION FORMWORK. Solid black portions of ribs are already concreted (rib sides are complete, too). Four electric winches raised the 240-ton unit in 8 hr.

there by a 64-wire set of cables (E).

Only the bottom of the third rib section was cast before the fourth falsework truss, the same as the third in every respect, was hoisted up and suspended from an 88-wire set of cables. After the section's bottom was poured, side walls and thin strips of the tops of both the third and fourth rib sections were cast. Temporary hinges, as already described, were left at all rib intersections.

• **Raising central section**—Next came the most dramatic event of the whole job: placing the formwork for the central section of the arch. In contrast to the other supporting elements, this one was made wide enough to accommodate all three ribs. Assembled on the ground into one 240-ton timber unit, 265 ft long, it was hoisted into place with the aid of the rib sections already in place.

As a preliminary, the gap between the first two rib elements at either end of the arch was grouted and the tops of these two rib sections further tied together with prestressing wires in an effort to have these portions of the ribs act as beams during hoisting of the center-section falsework. The first three sets of cables were slackened.

Then two 11-ton electric winches were set up on each of the outer ribs at the second sections, plus one hand winch on center rib for compensation.

After eight hours of careful hoisting, the central section was eased into place. The ends of this unit, encased in concrete as were all other butt joints in it, were supported against concrete blocks connected with the bottoms of the fourth rib sections. After the steel ties of the center section falsework were released, the ribs, for the first time, began to act as arches, although shaky ones. This also caused the stresses on the falsework cables to be reduced considerably.

Concreting then proceeded in an exactly symmetrical manner, back and forth between the center span and the uncompleted top flanges of the third and fourth rib sections. Any error or carelessness would have caused the arch to sway longitudinally.

After bottoms and sides of ribs in the center span were cast up to the crown, special hydraulic flat jacks and wedges were placed at the crown to regulate level and bending moments during the rest of construction. There were fifteen 360-ton units and thirty-three 82-ton units bearing against special precast crown blocks. Also at this time, the forms were stripped and lowered to the ground, starting with the center unit and proceeding toward the abutments.

Then the spandrel column pouring began, starting with those adjacent to the arch abutment column. Again concreting was exactly symmetrical, going back and forth between columns on each side and tops of the central ribs. Columns were braced longitudinally during erection, as had been those in the approach spans.

Cross beams, and deck beam and slabs were placed by gantry crane, as were their counterparts in the approaches.

So well did Freyssinet calculate deflections during concreting that after all elements are in place, there will be only a 3-in. gap in each of the ribs at the crown. These will be grouted in and the center sections of ribs prestressed. Finally the hinges between rib sections will be grouted in and connected the same as were the hinges between rib lengths one and two.

Undoubtedly the severest test the arch will ever be put to occurred during erection. The front axle of the gantry crane used to set the deck exerted a force of 78 tons on the bridge, and at a time when the arch sections were still hinged.

• **Credits**—The credit for successfully implementing Freyssinet's bold design and erection method goes in large part to Robert Shama, managing director and chief engineer of Empresas Campenon-Bernard de Venezuela. D. Martin is assistant manager, J. Dovaine and J. Paroonagian, superintendents. J. Delar, is in charge of arch construction, P. Loup of precasting, and A. Gallico of prestressing. K. Pederson supervised erection and assembly of the precast elements.

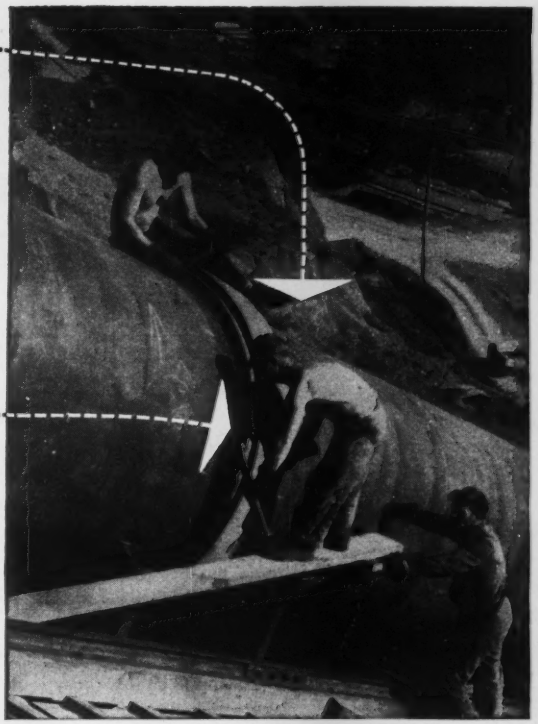
Campenon-Bernard is a world-wide consulting engineering and contracting firm, with headquarters in Paris, France. Although Freyssinet heads his own consulting organization in Paris, named STUP, he also performs all design for Campenon-Bernard.

Assisting him in the design of the Caracas-La Guaira bridges were Jean Muller for the structure and Pierre Decharne for the falsework. Muller is now head designer with the Freyssinet Co. of New York City, holder of the U. S. franchise for the French engineer's prestressing patents.

Henrique Siblesz is supervising the entire project for the owner, the Venezuelan Ministry of Public Works.

from penstocks to water mains . . .

Dresser Couplings absorb pipe movement, prevent built-up stresses, speed construction

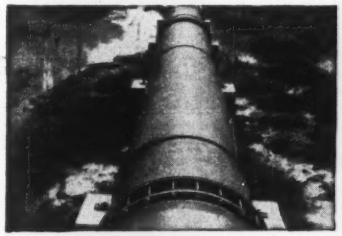


75″ penstock of the British Columbia Electric Co. One of three installed at Bridge River, using Dresser Couplings specially designed for the job. With Dressers, construction time was cut from months to weeks, due to simplicity of installation. And penstocks have remained bottle-tight under very high pressures, despite severe weather conditions.

On either exposed or buried lines, from ⅜″ to 72″ diameter or larger, your best protection against vibration or movement stresses is a Dresser Coupling. Each of these "flexible-tight" joints takes up to ⅜″ expansion-contraction movement . . . up to 4° deflection . . . cushions your line at every joint. Specially compounded rubber gaskets soak up vibration like a sponge.

Installation of Dresser Couplings is simplicity itself. Any workman can install them; the only tool needed is a wrench. And fast? On a typical 48″ water line, 40 lengths of pipe were laid in one 8-hour day using a two-man joining crew.

Performance on half a million miles of pipe proves Dresser dependability.



Over swamps and marshy ground, where earth movement must be considered, Dresser Couplings keep Savannah's, new 14-mile, 42″ water supply artery completely tight.

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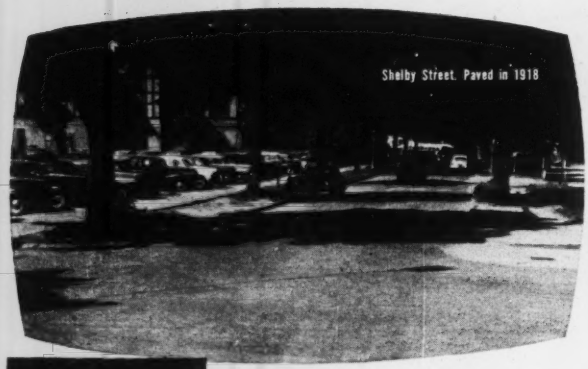

WOODSIDE AVENUE. PAVED IN 1937

CRESCENT DRIVE. PAVED IN 1940

BROAD ST. AT MAIN. PAVED IN 1938

BELLMEADE DRIVE. PAVED IN 1941

BROAD STREET. PAVED IN 1918

SEQUOYAH DRIVE. PAVED IN 1947

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DALE STREET. PAVED IN 1919

CAROLINA STREET. PAVED IN 1947

GIBSON MILL ROAD. PAVED IN 1923

SEWANEE AVENUE. PAVED IN 1948

RAVINE ROAD. PAVED IN 1923

MIDLAND STREET. PAVED IN 1951

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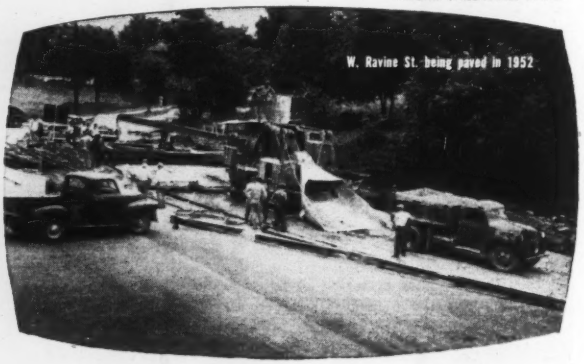
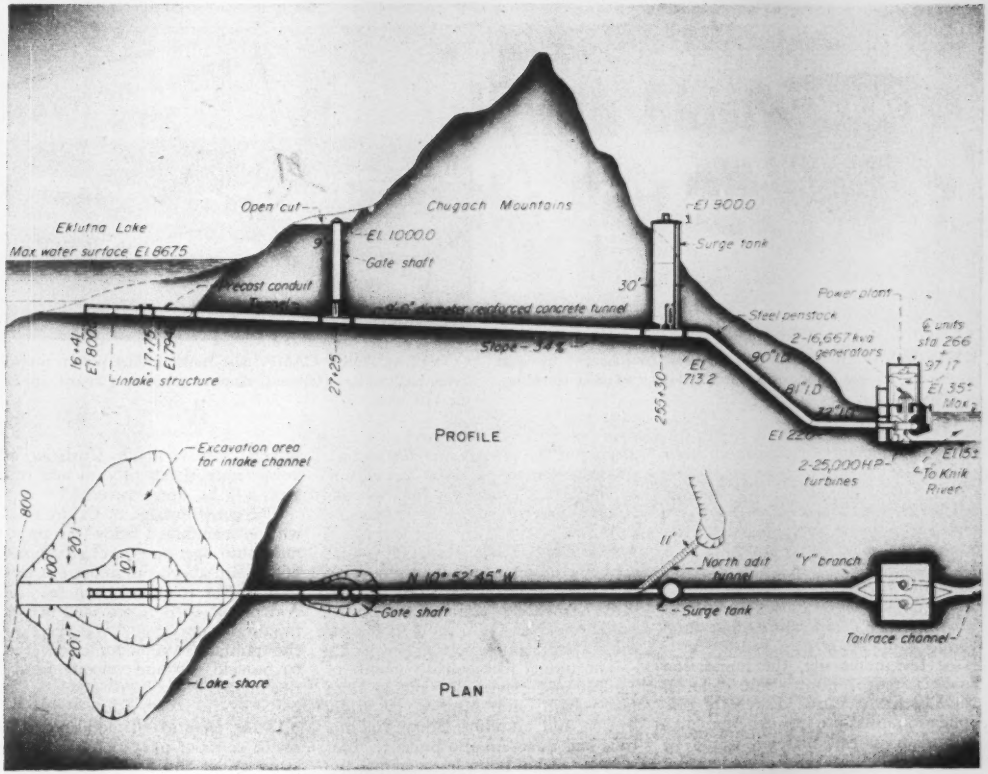
BRISTOL HWY., PAVED '25, WIDENED '41

WALNUT STREET. PAVED IN 1928



WATAUGA STREET. PAVED IN 1926

POPLAR STREET. PAVED IN 1933



TUNNEL IS MAIN FEATURE of project. It will conduct water from existing lake to a power plant. Underwater intake structure will be made up of precast sections.

Eklutna is USBR's first project in Alaska

Byron G. Felkner
Construction Engineer
U. S. Bureau of Reclamation
Palmer, Alaska

CONSTRUCTION is advancing rapidly on the U. S. Bureau of Reclamation's Eklutna project, an Alaskan hydroelectric development that is to provide power for the Anchorage area.

Since last fall, when construction began, the gate shaft for the intake of the Eklutna Tunnel has been sunk to its full depth of 206 ft; excavation is proceeding on the lower penstock portal; and work is being pushed on the adit portal high on the mountain near the downstream end of the tunnel.

The tunnel, the project's principal feature, is a 4½-mile-long, 9-ft-dia pressure conduit that will carry lake water down to a power plant near tidewater. With its companion facilities the tunnel is being built under a $17,350,000 contract awarded last September to Palmer Constructors, Omaha, Nebraska. Palmer is a three-firm organization: Peter Kiewit Sons; Coker Const. Co.; and Morrison-Knudsen Co. This is the first major contract awarded on a Bureau of Reclamation undertaking outside the mainland of the United States.

Development of the Eklutna project marks the initial step in a comprehensive program authorized by Congress in 1949 for use of the water resources of Alaska. The project is to make available an annual output of 143 million kwh of firm and 16 million kwh of secondary electrical energy to the surrounding area.

In addition to the excavation and concrete lining of the Eklutna tunnel and 9-ft-dia concrete-lined gate shaft, the contract schedule calls for a 187-ft-high concrete surge tank, 30 ft inside dia; excavation and lining of a 1,390-ft-long penstock tunnel; and alterations to an existing natural dam. This work is to be completed by August, 1954, under provisions of the contract.

• **Glacier made dam**—The project's power development is made possible by diversion of water from Eklutna Lake, about midway between Anchorage and Palmer. A glacier retreating up the Eklutna Valley left a natural dam across the creek, creating Eklutna Lake, 7 mi long and 200 ft deep, 868 ft above sea level. Power will be produced by diverting water from the lake through the Eklutna tunnel under Goat Mountain—which lies between the lake and Knik Arm, an inlet to the sea. Water thus diverted will go into 30,000-kw Eklutna Power Plant, to be constructed near the Anchorage-Palmer highway. The

HYDROGRAPHIC SURVEYING was complicated by cold weather. Men cut 12 in. of Eklutna Lake ice to make soundings at intake site.

CONTRACTOR'S CAMP, near north tunnel portal, provides living facilities for 160 men. Another camp near intake will care for 120 men.

plant will operate at a maximum head of 850 ft.

• **Underwater intake**—Eklutna Lake water is tapped at a level below operating storage. The intake structure is to be placed entirely under the lake surface, thus providing a free access for the water under thick ice formed in the winter. (Temperatures may drop as low as minus 60 deg F.)

At the intake site, the foundation material ranges from a fine colloidal mud to silt in varied degrees of consolidation. Because construction of a cofferdam in this material would be difficult, 400,000 cu yd of underwater excavation will be suction dredged.

• **Intake precast**—The intake structure has been designed in precast sections for placing and joining together underwater. The intake proper consists of 112 ft (centerline length) of rectangular precast concrete sections, of varying depths, each 26 ft 8 in. wide by 37 ft long. Timber trashracks are to be supported along the sections' upper surfaces. Immediately downstream, a precast transition section is to be placed, the inside tapering from a rectangular section 9 ft by 22 ft 8 in. to a circular section 9 ft in diameter.

From this point the water will be carried forward 225 ft to the beginning of the tunnel proper through a 9-ft-dia precast concrete pipe. The 16-ft section of precast concrete pipe, weighing 40 tons, will be picked up from the shore casting site by a gantry crane traveling on a wood-pile launching trestle. The pipe section will then be lowered into 25 ft of water at the end of the trestle, picked up by a floating barge and transported about 1,000 ft to the intake site. It will then be lowered about 75 ft into its final position. The sections of pipe will then be joined by divers. Manufacture and placing of the precast intake structure and concrete pipe will be carried out by the Ben C. Gerwick Inc, subcontractors under Palmer Constructors.

• **Tunneling**—Three points of access are being used for tunneling: Through the gate shaft; through the adit located near the surge tank at the tunnel outlet; and through a short shaft near the downstream end of the penstock.

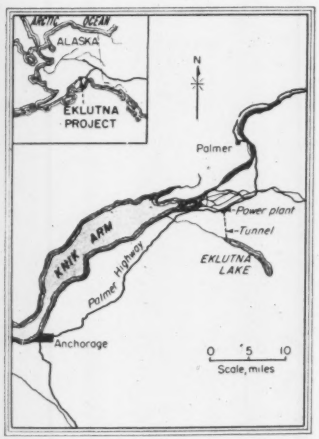
The tunnel rock consists mainly of argillite and graywacke, ranging from fairly hard and massive to badly broken and crumbly. Some volcanic tuffs and flows are also present. Roof support anchor bolts, fastened into the overhead rock are provided where suitable. In poorer ground steel support ribs are being used.

Under the current contract, additional earth fill is to be placed, to stabilize the existing natural dam against excessive floods. Upstream and downstream slopes of dam and other areas will be riprap covered.

The active storage of Eklutna Lake will be maintained below the present maximum operating level elevation of 868 ft and above the minimum elevation of 814 ft above mean sea level. A depth of 10 ft is provided between minimum operating lake level and the trashrack to allow for ice cover and to provide seal and velocity head at the intake.

• **Living facilities**—In addition to the major contract now in force for construction of the Eklutna tunnel and its features, other construction has been performed on residences for the government camp (near the power plant) and a steel warehouse.

The contractor's camp is near the downstream tunnel portal and consists of dormitories for 160 men, a water supply, sewer system, electric plant, mess hall, and offices. A second smaller camp for 120 men has been built near the tunnel intake.



EKLUTNA PROJECT is near tidewater, on Knik Arm above Anchorage, Alaska.

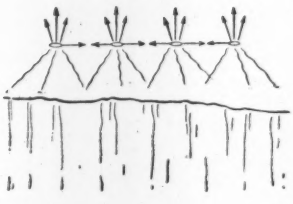
Project faces curb

Authorization to proceed with construction of the Eklutna power plant was delayed (ENR Sept. 4, p. 72) when Lindsay Warren, U. S. Comptroller General clamped down on the Bureau of Reclamation for overcommitment of funds for the project.

Last spring the Bureau of Reclamation sought an increase in appropriation for the Eklutna project. The House Interior Committee asked for an opinion from Warren's office. The resulting blast against overcommitment may have far-reaching effects, not only on the Eklutna project, but also on the degree of interest shown by contractors asked to bid on federal projects bearing fixed-ceiling price tag.

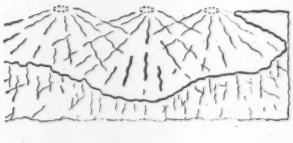
BLASTING CLUES from the ATLAS MACHINE-GUN CAMERA

Which Blast Gave the Best Breakage?

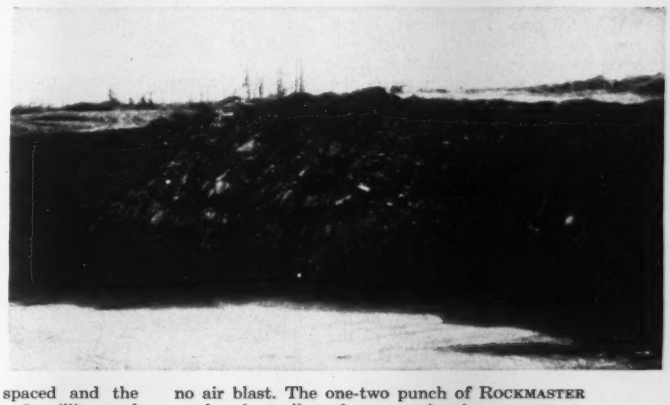


This blast is spectacular...

These geysers of wasted explosives energy were followed by a sharp air blast and wild flying rock. With holes spaced too closely and detonation from the top, the photo shows that initial action was upward and from hole to hole. As a result, the burden was quickly pushed away from the face before it could be fully stressed. This meant poor breakage . . . extra drilling and secondary shooting.



This blast is confined...



Here the holes were properly spaced and the alternate method of ROCKMASTER® milli-second delay blasting was used. Holes were detonated from the *bottom*. Since the initial force of the blast could not escape upward, there was practically no air blast. The one-two punch of ROCKMASTER produced excellent fragmentation by concentrating all the available explosives energy directly at the burden. The result was a well broken and well placed rock pile—boom height for easy digging.

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Labrador railroad pushes north to iron range

Robert H. Dodds
Associate Editor

OLD-TIME Canadian railroaders tend to depreciate the difficulty of building the 360-mile rail line into the Labrador wilderness to a great new iron ore body. But modern construction conditions, oddly, have made it one of the toughest projects on this continent.

Here's the contrast:

Fifty years ago the owner would have hired thousands of "station men"—individual contractors who undertook to do the earthwork for a few hundred feet of railroad in a season. Wheelbarrows, shovels and hand drills were their equipment; horses and foot power their means of access to the work, no matter the distance from civilization. They camped on their stations.

Today machines do the work. They do it faster and with a comparative handful of men, but require a heroic supply effort. The men now demand housing in comfortable camps, complete with electric lights, showers and fresh foods. Unnecessary frills to the old timers, such operations give the owner complete satisfaction for they assure that ore will be moving to seaboard at the earliest possible moment.

• **Where it goes**—The Quebec, North Shore and Labrador Ry., which will bring iron ore to the Gulf of St. Lawrence from a great new range in the interior of the Quebec-Labrador peninsula, goes northward 360 miles from Seven Islands, Quebec. Plunging almost instantly into the bush, it is a pioneering operation all the way. Not a single settlement nor road existed in the region when surveyors began staking out the location.

Moreover, Seven Islands itself had —and still has—neither road nor railroad to the outside world. Major supply must come by ship during eight or nine ice-free months of the year. Before the railroad workers came, Seven Islands was a fishing village of 1,200 including 500 Indians. Now the population is 4,000.

• **Why it's news**—The project's construction interest lies in the way the contractor is adjusting today's heavy-machine, light-manpower methods to an operation better suited to the now-unavailable methods of the past.

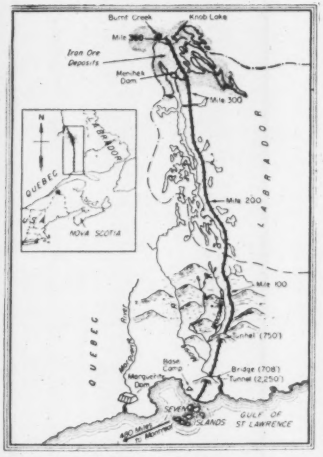
Significance of the project lies in the fact that its frontiers are on the outer edges of the temperate zones. More and more, contractors will be called upon to work in the tropics or the far north. Those who go north will find useful information in this account of work along the QNS&L location.

• **What it involves**—Grading for the railroad is the most challenging part of the work, because it is being done in isolated stretches. Track laying is mostly conventional, although a new twist is being tried, to increase track-laying speed and overcome the time disadvantage of doing all work from one end. Other operations include the building of waterfront and terminal facilities at Seven Islands, and the construction of two hydro power dams.

One of these dams, near the upper end of the railroad line, is distinguished by the fact that 60,000 bags of cement for its powerhouse are being flown in this summer by round-the-clock three-airplane freight service. In fact, airlifting operations, which supply many phases of construction, constitute the most spectacular aspect of the contractor's adjustment to his frontier environment. One phase of the airlift—carrying fully-assembled pieces of construction equipment—was told in ENGINEERING NEWS-RECORD last year (July 19, p. 36). That story will be rounded out and brought up to date next week in an article on supply routes for the work.

• **Time elements**—According to Hector MacNeil, chief engineer of QNS&L, the railroad will be complete by the end of 1953. At the end of this construction season, he is counting on 190 miles of track being in. (The contractor is less optimistic, predicting 160 miles.)

By midsummer this year, right-of-way clearing was complete on half of the 360 miles. Grading was better than a third complete, and track had been laid from Seven Islands to Mile 41, at a near-mile-a-day clip.



IRON ORE ROAD—Rail line plunges northward to new ore fields, through 360 miles of wilderness.

• **The contract**—Work began in the fall of 1950, when the railroad construction contract was awarded to a joint venture: Cartier Const. Co., Ltd.; McNamara Const. Co.; Fred Mannix Co.; and Morrison-Knudsen Co. of Canada. Owner is the Iron Ore Company of Canada, Ltd. (IOC) of which QNS&L is a subsidiary. Other subsidiaries include operating companies for the power dams, and Hollinger-Ungava Transport Ltd., which operates the airlift. IOC was formed by Hollinger Consolidated Gold Mines Ltd., M. A. Hanna Co. of Cleveland and five steel companies in the United States. Financed at $200 million, IOC initially alloted $110-million to the railroad, including $40 million for equipment and $70 million for construction.

After a winter of bringing in equipment (by boat) and getting organized, CMMK (the official abbreviation of the joint venture) went to work in earnest during the 1951 season. Most important work that year was driving a 2,200-ft tunnel and building a 706-ft bridge, both near Mile 12, and starting four miles of shelf cut in a rock cliff that ran more or less continuously from Mile 12 to Mile 16. These were the real construction bottlenecks, particularly because they occurred so near the beginning of the work.

Above the bottlenecks, however, 55 miles of grading was done, part of it from camps spotted along the line as far as Mile 100 and part of it from Knob Lake (Mile 360) southward. Airstrips had been built to provide access to the camps, and during the first winter there was land access as far as Mile 40 for equipment haulage and camp-building materials.

During the 1951-52 winter the contractor kept on nearly full crews, pushing rock work and developing a cold-weather tote road to Knob Lake. Traversing the ice of several lakes in its upper reaches, the road carried a trickle of materials and supplies all the way, but it was most useful as far as Mile 163. It still is necessary to fly everything above this point.

RUGGED COUNTRY and heavy rock excavations characterize the first 150 miles of Quebec, North Shore and Labrador Ry. construction. Here truck and shovel muck near Mile 16, the upper end of the job's worst bottleneck. (John Rodriguez photo, others by ENR staff except as noted.)

• **Location**—Above the tunnel, bridge and cliff bottlenecks the location follows the valleys of three rivers of the Moisie system, climbing to El 1885 at Mile 94, with a maximum grade of 1.32% for a distance of 7 miles starting at Mile 67. It then crosses a rugged region to the Quebec-Labrador boundary (height of land) at Mile 150. Fortunately the line runs parallel to the region's ridge lines, so neither grades nor grading are heavy in this stretch. Summit elevation, at Mile 150, is 2,056. Then there is an easy descent to the Labrador plateau (maximum grade against loaded ore trains is 0.4%, compensated for curvature). This plateau, on which the railroad is located for about 200 miles, has much more water than land. A traveler in an airplane sees lakes of all sizes and shapes, as far as the eye can reach.

• **Muskeg promised trouble**—Thanks again to the "grain" of the region, it was possible, with the aid of aerial surveys, to pick a good land location across the plateau. However, much of the land—about 40 miles along the chosen center line—was covered with muskeg. How much of a problem would this be? It remained for ground survey parties to learn the good news: In most places muskeg was only two or three feet thick, over good granular material. Consequently, although grading would be wet, there would be none of the problems resulting from deep muskeg.

• **Bridges**—The only major bridge is the truss structure at Mile 12. Crossing a deep gorge, its construction involved helicopter assistance in setting up a lightweight materials cableway. The remaining bridges, 24 of them, are plate-girder structures, varying from 60 to 100 ft, on from one to three spans. Most of these bridges are being installed on foundations shortly in advance of rail-laying, because girders must come in by rail.

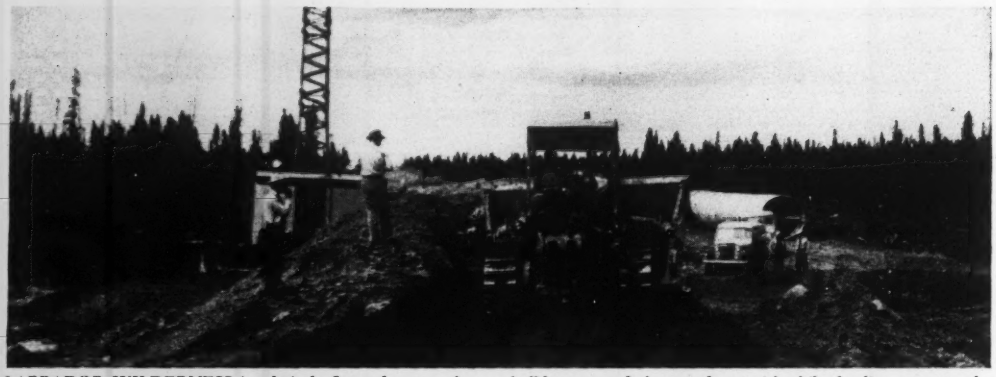
• **Culverts flown in**—Culverts, however, are being installed as grading progresses. Of corrugated iron, varying from 24 in. to 144 in. dia, they will total 81,000 ft in length by the time they all are in. They are flown to main camps in various forms.

At first, small pipes as well as bent plates for the larger sizes were flown in. More recently the pipe supplier has set up plate-bending and pipe-fabricating machines in temporary shelters at some of the main camps so the more easily-handled flat corrugated sheets can be flown up the line.

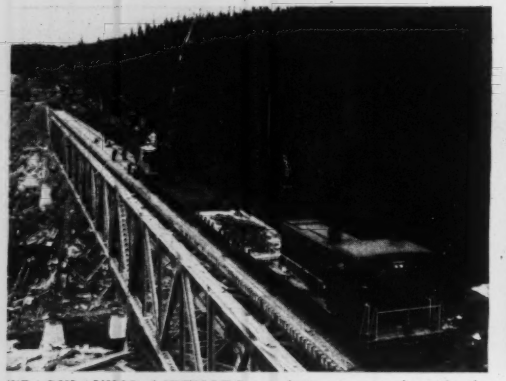
• **Heavy rock work**—Access problems were particularly vexing on the shelf work between Miles 12 and 16. Because the gorge wall was broken by deep ravines there was no practical way to provide tote roads that would gives access to several points along this location. It was necessary to work from the ends only. At first, wagon-drill crews worked the slopes down in small bites. When suitable benches were established, shovels and trucks mucked and hauled larger blasts, working toward each other.

But, with 400,000 cu yd of rock to move, it was time-consuming work. Begun in mid-1951, the job was not completed until June, 1952, even though rock excavation continued through the winter. This was long after the nearby tunnel had been completed (August, 1951) and three months after the connecting Moisie River bridge was ready for rail.

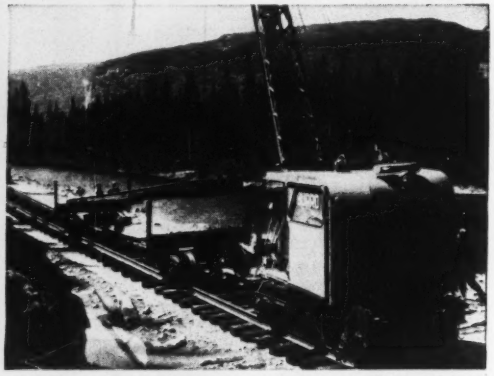
• **Grading**—But once the shelf was built there were many miles of grade ready for tracklaying crews. The upper end of the gorge bottleneck had been worked from a main camp (and airstrip) near Mile 22. Grading crews, using tractors, scrapers, shovels and trucks had finished their work from Mile 16 to Mile 24, and other crews, from main camps at Miles 28, 40 and



LABRADOR WILDERNESS is relatively flat and wet, so location threads among lakes, swamps and streams. At Mile 160, bulldozer spreads borrowed material while dragline excavates for corrugated metal culvert



TRACKLAYING METHODS are being improved, with the hope of attaining two-mile-a-day progress. At left, track crane lays single rails on 706-ft Moisie River Bridge, the job's longest.



At right crane disassembles car that carries prefabricated track panels. Car removal enables crane to get at a second carload of panels, eliminating rail-car switching problems.

59, had the grade ready to Mile 60.

Each of these camps initially had only air-access to the outside world. As their grading assignments have been completed the contractor has built airstrips and main camps farther up the line. Where and when the tote road is passable he moves buildings and equipment on the ground, but airlifting, particularly of new items from Seven Islands, continues to be a vital part of construction supply.

• **Muskeg work**—The only unusual grading method is just now getting under way. Conducted out of camps at Mile 163 and Mile 290 (the latter the newest camp on the line) it copes with the peculiar thin-muskeg condition between those two camps. Two draglines work along the two ditch lines, casting stripped ditchline muskeg off the right-of-way, then casting the underlying granular material inward on top of muskeg to form the grade. The grade's muskeg quickly compresses, without mud-wave danger, to a thin organic layer that promises little further settlement. Draglines work backwards, on top of the muskeg, riding on single or double mats.

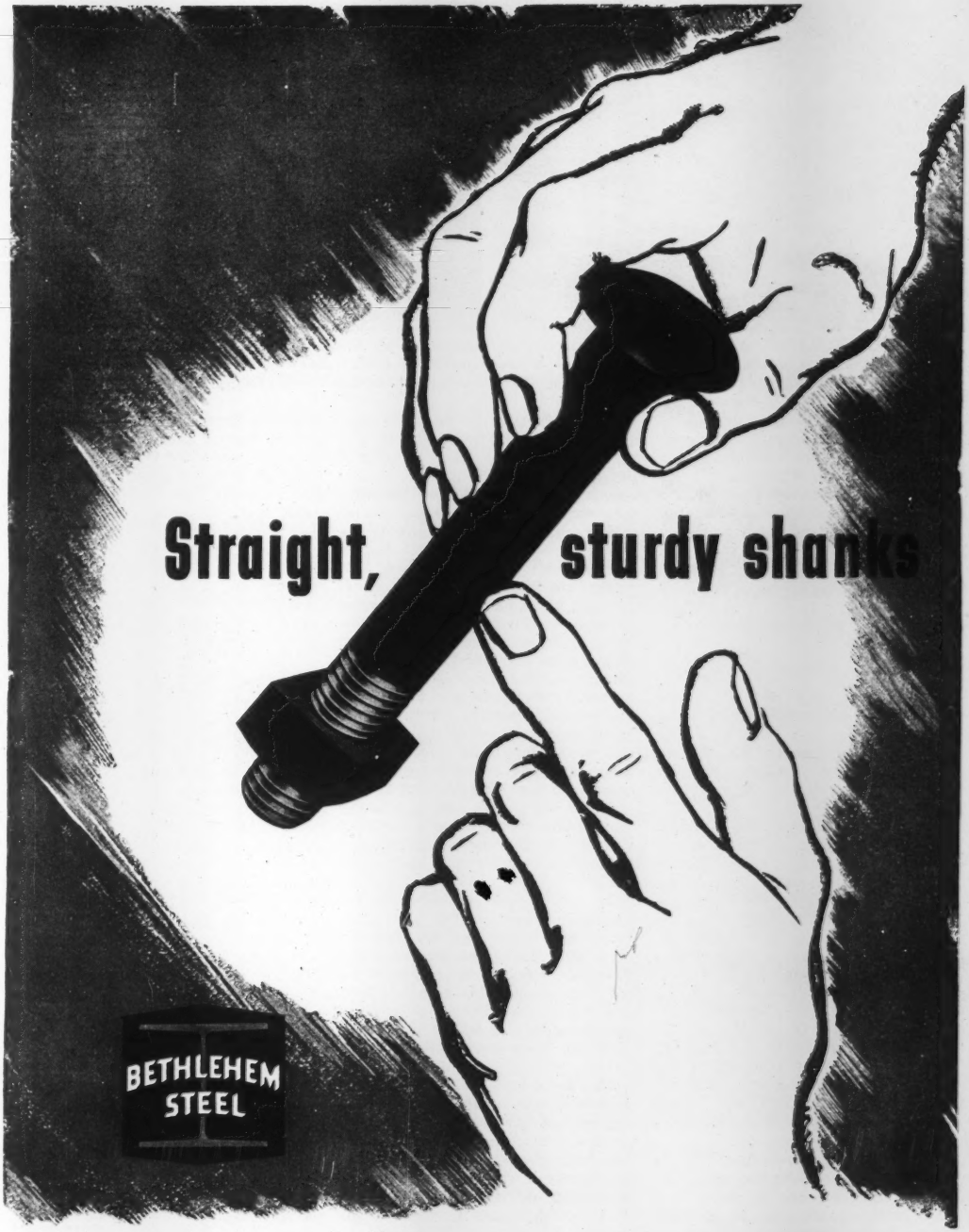
• **Equipment maintenance**—Because of the airlift, grading equipment gets more than normal attention at main camps. Items such as scrapers, the heaviest tractors and large trucks come in by air (an airlifted 1½-yard shovel is working south of Mile 163). Usually they are in pieces, so they have to be assembled. Bulky and overweight pieces are cut with a torch to sizes and weights the planes can handle; these pieces must be reintegrated by welding.

• **Camps**—In general there are one or more fly camps for every main camp. The setup for Mile 163 is an example. Located near the lower edge of muskeg country, it is the base for work between Mile 150 and Mile 200. About 150 men live at the main camp. Another 150 live in three fly camps. At Mile 170 fly camp, where 65 men live, their equipment includes nine tractors, five scrapers, two excavating machines, three trucks and associated smaller equipment.

In the first 150 miles, camps are closer together because grading work is heavier. Four camps near the lower end already have been discontinued.

At first, main camps had plywood panel construction throughout, but the buildings proved too difficult to move, so there has been a trend toward portable buildings and winterized tents. Offices, messing facilities, and bathhouses continue to be plywood in the newer grading camps.

• **The men**—The desire to provide substantial living accommodations, evidenced by the high-type buildings in early camps, is consistent with other personnel policies designed to attract and hold a construction force. While the pay is not high (range of



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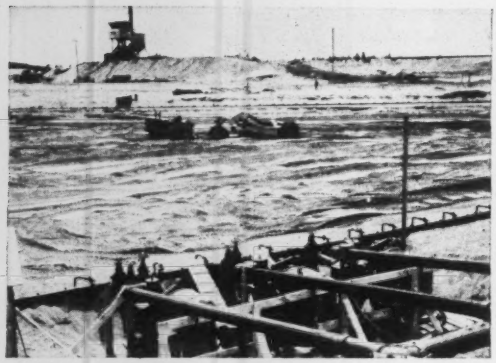

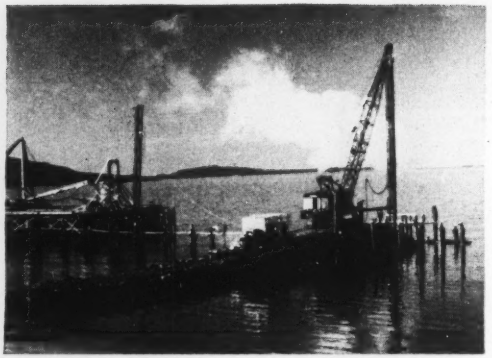

TERMINAL FACILITIES at Seven Islands involve mechanical ore handling, from car to ship, as well as to storage piles. At left is wellpointed-protected excavation for 50-ft-deep hole in which ore-car dumper foundation will go. At right is pier work. A marginal wharf 1,600 ft long will carry machinery for belt-conveyor loading into ore ships. (John Rodriguez photos.)

hourly rates: $0.90 for laborers, to $1.85 for shovel operators) there is opportunity to work long hours (two ten-hour shifts is a regular day), seven days a week. Because there are no distractions in the wilderness, continuous work does not seem to be an undue burden. All pay is at the straight-time rate. Most of the men are there to make a modest stake. If a man stays until Dec. 15 he gets a bonus based on the number of days he's been on the job. Laborers get an extra 50¢ a day; machine operators get $1.00.

Subsistence costs the contractor $3.50 a day per man. The men pay $1.50 a day.

Most of the men are French-Canadian, from the populated parts of Quebec.

• **Tracklaying**—Many of the displaced persons work on tracklaying, which is conducted on an entirely different logistic basis from the grading. Being pushed through from the lower end only (a "muzzle-loading job" it's called), tracklaying is rail-supplied. Men live on an 18-car train that is moved ahead whenever a new passing track is built (every 10 to 20 miles).

• **Prefab track**—Until midsummer, the work was going at a mile or less a day, but now the contractor is perfecting a prefabricated track panel system that promises to run the mileage up to two a day.

In the original procedure, a night crew spread ties along the grade, setting every other one in place. The day crew, spearheaded by a track crane hauling flatcars of rails, set the rails, put in the rest of the ties and spiked them down. Until rails were spiked they were held at gage by "bridles"—rigid bars with rail-base clamps at their ends. In panel construction, rails are spiked to all ties at the base camp, where repeat-production jigs are set up. These rail-length panels are loaded on job-made cars (see photo) whose rail-and-tie frames can be removed from the trucks.

The cars with their loads are pushed to the track crane, which picks up a panel and swings it around to place on the grade. Moving forward, and towing the cars, the crane picks up another panel and swings it to place, and so on. When a car is unloaded, its frame and two trucks are hoisted separately off the grade, so the crane can get at the next special car in line. The process is repeated as long as work trains feed carloads of panels to the track crane's train. When a day's work is done the track crane reassembles the special cars, which then are hauled back to a supply yard for the next day's panels.

In an intermediate method, the special cars were used to carry individual rails. Here, also, the cars' disassembly feature eliminated switching problems. Crews working behind the panel-laying operation complete bolting and spiking. Bolts are tightened mechanically and spikes are driven with jack hammers.

• **Ties from Texas**—Tie supply is not as easy as one might think, considering the fact that the line runs through a wooded wilderness. Except in valleys, trees grow sparsely and slowly in this northern climate. For instance, a 100-year-old spruce may be only 5 inches in diameter. That's not enough for a tie. However, a tie camp at Mile 17 is producing about a third of the job's needs. Another third—500,000 ties—is being brought from Texas, and the remainder is imported from Canadian sources. Imported ties are pressure-creosoted for mainline use, while native ties, to be used in yards and passing tracks, are left untreated. An exception in the latter group is cedar, which receives local treatments.

Ballast is to be gravel throughout. At present a large gravel pit is being opened up at Mile 22. Engineers and contractors also are investigating other promising pits at various points along the line.

• **Terminal facilities**—The Mile 22 gravel also is being processed at the base camp for concrete-aggregate use in terminal and waterfront facilities. These works extend for about two miles in an area just east of Seven Islands. Half of the area is the railroad's receiving yard, including locomotive and car shops, as well as locomotive storage buildings. The other half is the iron ore terminal, which is owned and operated by IOC. This terminal will feature automatic ore-car handling and dumping, with subsequent conveyor-belt ore handling to either the ore dock or to stockpiles. The ore terminal will have eight ore-train tracks (100 cars) under the present contract with CMMK; there is room for 40 more tracks.

The dock consists of an 800-ft section for belt-loading of ore into ships, and an 800-ft section for ship-mooring. Built parallel to the shore, it is a tied-back sheetpile bulkhead type, with pile-supported relieving platforms. The design is expected to resist heavy ice pressures.

• **Management**—General manager for the owner's operation is W. H. Durrell, Hollinger-Hanna Ltd., Mr. MacNeil is chief engineer of the railroad. In charge of CMMK operations is J. G. Pickard.

Speed-up proposed for NLRB rulings

The individual efforts of the AFL Building Trades leaders to break loose from some of the restrictions of the National Labor Relations Board came to naught when Senate bill 1973 died in the House. (ENR July 10, p. 22) Now, it is reported, the AFL will work to get its combined views into a single bill.

Since both Republicans and Democrats have pledged changes in labor laws, the AFL has decided that a unified effort will pay off in the changes they want.

What sort of changes will be acceptable to both Republicans and Democrats?

Here is a situation and its solution which might find bi-partisan acceptance:

One big problem under the Taft-Hartley law is the amount of time it takes to get a ruling from the NLRB.

For example:

- If you file an unfair labor practice charge with the board today, and it is contested, you might get a board decision around Thanksgiving, or Christmas, 1953.
- If your adversary in this action does not accept the board decision, add another year or so for the enforcement process in a U. S. circuit court. If the other side is still belligerent, add a third year—or more—for adjudication of a contempt petition. In one case, this last step was stretched out for seven years.
- Getting a representation election may take from 70 to 140 days.

It's a pretty good bet there will be some action taken by the next Congress to change this situation. Some of the research for action has been done by Jack Barbash, staff director of Senator Hubert Humphrey's Subcommittee on Labor and Labor-Management Relations. Barbash has had 15 years' work in the labor field, three of them with the Humphrey committee. He has the confidence of at least a majority of that committee, and his recent independent research and report on speeding up NLRB treatment can influence congressional action.

- **Non-communist oath**—As a general recommendation he would waive the non-communist oath requirements for labor organizations which certify that their constitutions or bylaws bar communists and fellow travelers from holding office—and that such provisions are being enforced. He also recommends eliminating the annual refiling, changing the law to require filing only when there is a change in officers. These changes would require legislative action.

Barbash said that local union officers are constantly changing, and the lack of a full complement of affidavits for any union involved automatically halts board processing procedures on that case. In most cases, the temporary noncompliance is technical.

He concluded that "at this time, the non-communist affidavit is serving no practical purpose. Well known communist party-liners have had no difficulty in signing affidavits that they are not communists.

- **Other changes**—Some of the changes he recommended were these:
- Establish a special circuit of the Circiut Court of Appeals.
- More vigorous use by the board of the injunction "to prevent the nullification of the effect of a board order while the circuit court is considering the petition for enforcement."
- Partial centralization of legal assistance to individual board members. Each board member now has fourteen legal assistants. The pool he recommends is like the old review division, but he thinks adequate controls can be set up to prevent the pool from making policy, which was the major objection to the old review division.
- Get the basic data when the complainant first appears by providing the assistance of a professional staff member instead of just a paper form and a receptionist.

- **Representation**—Major recommendations relating to representation procedures (of special interest to the construction industry) were:
- Reinstate the prehearing election. This was a technique the board developed under the Wagner Act, but was stopped by Taft-Hartley, unless there is consent by everyone concerned. The prehearing election washed out many of the issues in dispute.
- Give the regional director the final judgment of all disputes in representation cases, subject only to a limited right of appeal to the national board.
- Permit, wherever feasible, the use of abbreviated means of determining majority status, such as cross-check of union membership cards and employment roster, instead of making an election mandatory.

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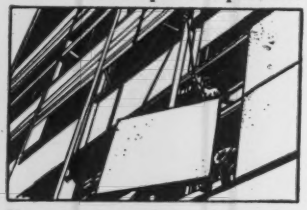

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Contractors fight minimum wage pacts

Maryland open-shop contractors have filed suit against the city of Baltimore. They charge that a Baltimore ordinance requiring payment of minimum wage rates by contractors on city work is unconstitutional under the state constitution and possibly under the federal constitution.

Suit was brought by the Associated Builders and Contractors of Maryland, a state-wide open-shop organization, in the Maryland Circuit Court of Baltimore. Four other complainants, corporations and individuals, have joined in the suit. The plaintiffs charge that the ordinance is unconstitutional because it prevents open-shop contractors from bidding on city work.

A companion suit by the Roland Electric Co., of Baltimore, is before the same court. The city had awarded a contract to Roland, after the company had stated that it did not pay the prevailing rates. Later the city rescinded the contract.

• **How rates are set**—Under the Baltimore ordinance, the city's Board of Estimates sets the rate that must be paid by contractors doing work for the city.

In adopting the rate, the complaint said, the Board of Estimates merely followed the union scale of wages suggested by Frank Clark Ellis, president of the Baltimore Building and Construction Trades Council.

The suit also held that the schedule of wage rates is arbitrary on its face because of an unreasonable classification of workmen and the requirement to pay men doing substantially the same work different rates of wages.

The complainants listed such examples as these:

• In the case of electricians: The scheduled rate for contractors is $2.75; the city pays electricians $1.45—a difference of 90%.

• For crane operators: The schedule rate is $2.60 and the city rate is $1.35—a difference of 93%.

• **Union to fight move**—Frank Ellis almost immediately announced that he would fight the move. His announcement said:

"The Association of Contractors and Builders has filed suit to strike down a law that has been on the statute books since 1945. Its validity had never been questioned before.

"The city council passed this law seven years ago and the contractors have never gone back to the council to try to have it repealed. Instead they resort to a fight in the courts.

". . . The Baltimore trades council is convinced that this law is fair, equitable and constitutional.

"We shall ask for permission to intervene in the court cases."

Wrangle halts work on Houston tunnel

Disagreement over who should handle a batch of concrete halted work last week on Texas' $10-million Baytown-La Porte tunnel.

Pickets were sent to the work site by the Houston Building and Construction Trades Council after a dispute between concrete finishers and Farnsworth and Chambers, general contractor for the tunnel project.

Two crews of concrete finishers were sent to the job after a request by the project superintendent. One crew was put to work pouring one batch of concrete. The other crew was asked to do patch work inside the tunnel because a load slated for their attention had not arrived. They refused and, when laborers were put to work on the second batch, walked off the job.

Paducah a-plant struck in one-day walkout

A surprise walkout at the Atomic Energy Commission's Paducah Ky., uranium separation plant pulled 15,000 construction workers off the job on Aug. 29. It was the second shutdown within two weeks, and brought to nearly sixty the number of walkouts occurring at the project since work started in January 1951. The men, at the behest of the union leaders, returned the next day.

This latest work stoppage involved 13 AFL crafts. Picket lines were set up.

E. A. Wende, project manager for the AEC said that only laborers, carpenters, cement finishers and electricians remained on the job during the stoppage.

An official of the operating engineers union blamed the walkout on the manner in which 200 engineers were discharged Aug. 28 by F. H. McGraw and Co., the prime contractors on the job. He said the union should have selected those to be released or at least should have been consulted.

McGraw spokesmen said the men were let out strictly according to seniority. It was a "force reduction" move, said the company.

Shortage of engineers seen by manpower group

Lack of an adequate national policy for use of American technical manpower is having a disastrous effect on our military effort and on the national economy. This belief prompted the Engineering Manpower Commission of Engineers Joint Council to call together the nation's top manpower authorities from government, the military establishments, the educational world, and industry to deal with the problem at a manpower conference in Chicago last week. Carey H. Brown, chairman of the Engineering Manpower Commission, outlined the views of the commission.

"Prompt action is essential," said Brown at a pre-conference interview at the Engineers' Club of New York City last week. "The shortage of manpower of military age is evidenced by recent statements regarding future draft policies, skilled mechanics such as tool and die makers are in extremely short supply, and an acute shortage of engineers and scientific personnel has been apparent for at least two years.

"The situation is getting worse," he asserted, "and it is high time that the problem be faced squarely by those in a position to do something about it."

"The nation's prize asset, its technical and productive superiority, is being dissipated, while a tug-of-war is going on among America's policy makers," he declared.

"In the field of engineering, for example, the shortage is such that industry is hard-pressed to maintain the flow of defense and civilian materials, and development is impeded. Coupled with an existing deficit estimated at 50,000, there is an annual demand for at least 30,000 engineer graduates in industry alone. Of 30,000 engineers graduated in the class of 1952, 5,000 have military obligations to fulfill as a result of R.O.T.C. programs, and others are being drafted into military service. The graduating class of 1953 will produce only about 20,000 engineers and the class of 1954 is estimated to turn out a scant 17,000. The year 1955 will see about 20,000 young men graduating from engineering schools and colleges.

"It's alarming," he said, "when it is remembered that out of these meager totals, military, industrial and government needs must be supplied. The output of the engineering colleges will be further diminished if there are draft withdrawals before graduation!"

ANOTHER

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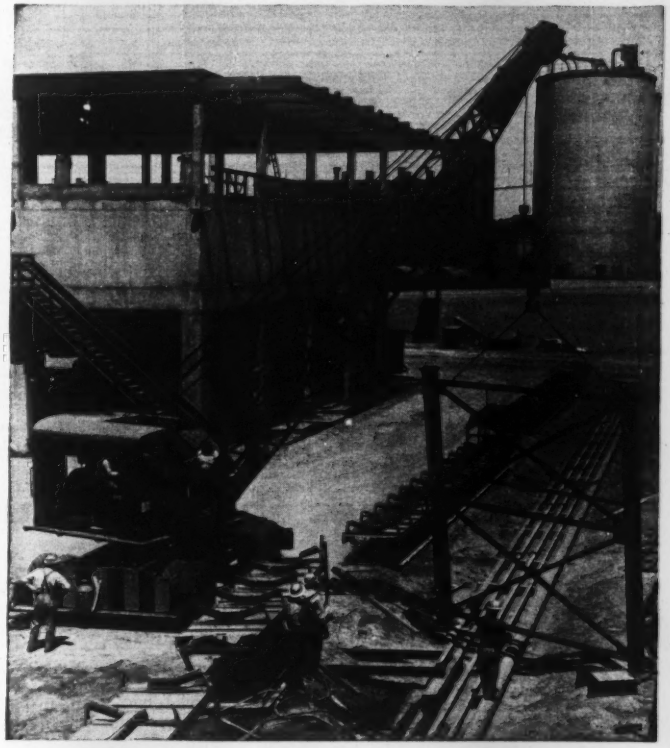

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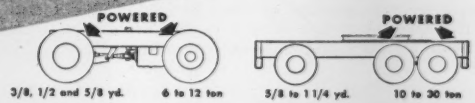

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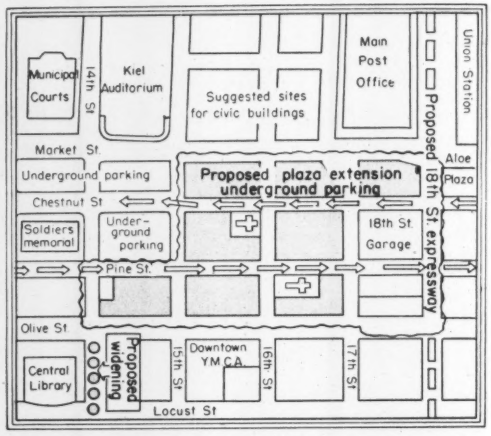
TO BE CLEARED soon is this rundown area. The block-square 18th Street Garage in the background will be retained.



TO BE BUILT are the projects shown on the map above. Co-operative effort by many businesses in the area is expected.

St. Louis moves ahead on slum clearance

St. Louis city officials and civic leaders have been conferring regularly this summer in a co-operative move to get an early start on a major slum clearance and urban redevelopment project at the edge of the downtown district.

The 10-block area to be rehabilitated is an important segment of the blighted semicircle that holds a choking grip on growth of the downtown business section.

A recent step forward was introduction in the Board of Aldermen of a bill to spend $1.3 million for a three-block strip between Memorial Plaza, across from Kiel Auditorium, and Aloe Plaza, across from Union Station. Under present tentative plans, this strip would be cleared for park purposes, using funds from $3.6 million in bonds voted in 1944 for parks and recreation, and automobile parking space would be provided underneath.

Appraisers for the newly-formed St. Louis Land Clearance for Redevelopment Authority concluded that it would cost the city $1.2 million to acquire the three-block strip and $77,500 to raze existing buildings and clear the area. An appraisal of the entire 10 blocks a year ago came to $2.8 million for land and improvements.

• **For private development**—Most of the remaining seven blocks is to be acquired by the authority, which has power of condemnation, and sold for middle-income housing development to private concerns including the St. Louis Urban Redevelopment Corp. This privately-owned civic corporation has more than $2 million in pledges subscribed by 70 large and small business firms and individuals on cash payment of 10%.

Under prodding by Mayor Joseph M. Darst, a slum clearance and housing enthusiast, the aldermen declared last May that the area was blighted within the meaning of the Missouri Urban Redevelopment Corporations Act.

The CIO Industrial Union Council supported the project after Mayor Darst made it clear that children would not be excluded; that the 20 families living in the area—12 white and eight Negro—would be rehoused by the St. Louis Housing Authority in low-income public projects, and that an 800-room hotel, if built, would have no favored position over competitors with respect to tax exemptions.

An area of extreme contrasts, the plaza district is fringed by the existing civic center, Union Station, the downtown business district on the east and the wholesale district on the north. It contains some ancient and decaying slum dwellings.

Excluding from consideration such structures as can be retained leaves about 10½ acres of property in the potential redevelopment site. City-owned alleys, expected to be absorbed in any replanning of the area, would add almost another acre. Three of these 11½ acres are in the three-block strip that is to form a new park connection between the existing plazas.

About 57% of the site under consideration is covered by buildings. Many are ramshackle structures 70 years old or more. In the last 20 years, 28 buildings in the area were wrecked, and building permits amounted to only $63,560 and repair and alteration permits totaled only $50,340.

Existing off-street parking spaces for 650 cars are included in the site. These would be eliminated, but underground facilities beneath the new plaza strip are expected to provide parking space for 5,000 automobiles. Curb space in the district accommodates fewer than 300 cars.

Tentative plans for the development already are being drafted. One proposal has been completed by Minoru Yamasaki, designer with Hellmuth, Yamasaki, Leinweber, Inc., and Harris Armstrong, architects retained by the city's land clearance authority. Another has been prepared for the Urban Redevelopment Corp. by Harland Bartholomew and Associates, St. Louis city planning firm.

Plans filed on microfilm saves storage space

Microfilming plans and specifications filed with the Miami Beach building department will reduce the amount of filing space required from 504 to 3 cu ft.

City Engineer Morris Lipp said transferring the records to microfilm would permit the building department to destroy some 30,000 sets of blueprints and specifications, accumulated since 1924.

It was on Lipp's recommendation that the city council appropriated $6,000 to finance the microfilming of the huge mass of documents. Eastman Kodak's Microfilm Recordak system was being used and a city employe was trained to operate the leased equipment.

Chief Building Inspector O. J. Pushkin estimated that it will take a year to film all of the plans and specifications filed from 1924 to 1947 inclusive.

The originals for five years back will be kept. Pushkin said he would lease the Recordak equipment every year or so and microfilm the sets filed during this five-year period. During the five years plans would be handled in the ordinary way.

• **Tricky work**—The job was proving harder than it sounded. Old plans, some of them rolled and tied for as long as 18 years, were dry and brittle. Handling them without spoilage was tricky. For example, it took three months to unroll, flatten out, and film about 500 sets filed in the years 1924-1930. After being unrolled, they had to be left under pressure for three days before filming.

Pushkin believed most of these problems would disappear when the very old files were out of the way, and less brittle, newer plans were filmed.

Because of the varying sizes of the blueprint sheets, the number of exposures being made on each roll of film ranged from 800 to 900. The rolls were being shipped to Eastman at Rochester, N. Y., for developing and winding onto permanent storage reels.

These reels were being filed in a fireproof cabinet. The only piece of equipment the city had to buy was a scanner, a device which enlarges the film 18 times, throwing it onto an illuminated screen where it can be read.

The original negatives were kept by Eastman in Rochester so that duplicate prints could be furnished if any should be lost or destroyed in Miami Beach.

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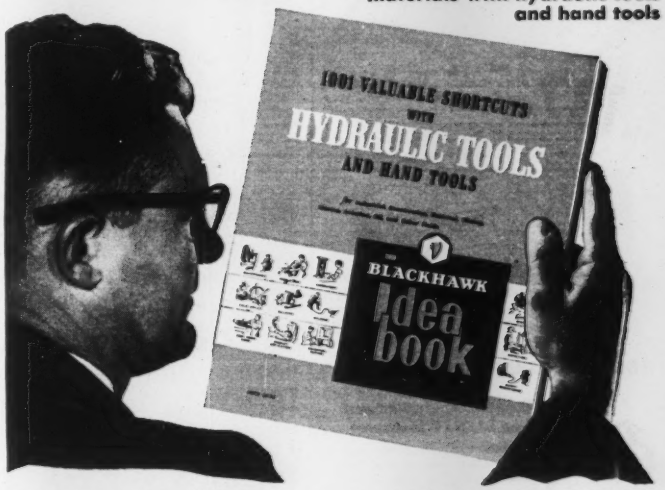

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2 state courts uphold redevelopment

Two state courts—one in Rhode Island and the other in Oregon—recently upheld the constitutionality of urban redevelopment laws.

In each case the law had been challenged by property owners who thought they were being damaged by the slum clearance programs.

Here is the Rhode Island case:

A 3-2 opinion of the Rhode Island Supreme Court recently upheld the proposed industrial redevelopment of a slum-blighted area in Providence. The opinion did not determine the constitutionality of the whole redevelopment law and eliminated from consideration redevelopment of "arrested blighted areas."

Arrested blighted areas are sections where improper development has led to poor use of land and to a kind of non-slum blight.

The decision was given in a suit brought by George Ajootian, owner of property in the area proposed for redevelopment.

The court's majority opinion found the following powers to be constitutional:

- Condemnation of slum-blighted land for redevelopment sites.
- Use of tax money to carry out redevelopment.
- Authority to sell or lease land irrespective of the cost of preparing the land for redevelopment.
- Fixing the price of land as an administrative function of government.

The proposed (Point Street-Plain Street) redevelopment project would open up about six blocks of slum-blighted land for controlled industrial and commercial use. Under a detailed plan approved last year, the Providence Redevelopment Agency will sell or lease the redeveloped land to private enterprise.

Estimated net cost of the project is $315,000, of which the federal government will be asked to pay two-thirds. The city's one-third will come from a $2-million bond issue authorized by Providence voters in 1948.

• Oregon redevelopment law—Constitutionality of Oregon's redevelopment law was upheld by Circuit Judge James W. Crawford. The decision cleared the way for a proposed $8-million clearance project in Portland.

Plans call for development of a 44-block area for industrial purposes.

The act had been challenged by Mr. and Mrs. H. J. Foeller, Portland property owners. They contended that the law violated the constitution by: An unlawful delegation of legislative powers; granting privileges to purchasers or lessees which do not belong to all citizens; and by conferring upon a housing authority the power of eminent domain.

In rejecting those contentions, the judge said the Vaughn Street sector is a "blighted area" within the meaning of the act and that the redevelopment plan is entirely within the authority conferred by the act.

The court held that the concern of constituted authority over blighted areas is a "real concern, substantially supported by facts, and the persistence and extension of such blighted areas avowedly affects the health, safety, morals and welfare of the people, as well as their economic status."

Rehabilitation, purchase or condemnation of property to serve the ends sought is entirely legal and appropriate, the court ruled.

City of Portland and Portland Housing Authority were defendants.

Pointing out that the validity of such laws has been upheld in many states, Judge Crawford declared that public housing and slum clearance are recognized public uses for which eminent domain may be exercised and, in the interest of which, the state may legislate.

Machine interred

A brand new motor vehicle counting device lay buried under two and one-half inches of bituminous concrete in Syracuse, N. Y., last week.

When state engineers learned of the city's intention to pave the street in which their machine was located, they requested that the grade be made to conform with the device's plate level. The city refused, feeling that the resulting dip might be a traffic hazard.

A showdown occurred when city paving crews reached the machine. They hesitated just long enough to cover the device with tar paper, and then the inexorable flow of concrete continued.

There was no disagreement over how the counter got there, nor was there argument over who was responsible. State public works officials cheerfully admitted failure to raise the machine in time to avoid interment by city pavers.

But meanwhile the status of the counter was clear. It just wasn't counting.

ASSEMBLING FRAMEWORK of Dnieper hydro-electric power house.—Sovfoto

Russia spurs construction

The construction race between the United States and Russia has taken a new turn. It may have entered the home stretch, say the Russians.

For a long time the United States has been leading the field unchallenged—except through the medium of propaganda. But now Russia is about to put on a challenging burst of speed, according to announcements coming from behind the Iron Curtain.

Draft directives for the fifth Five Year Plan, translated from a Russian language broadcast by the Moscow radio and published in the NEW YORK TIMES, outline the Soviet program covering 1951-55. Stalin has announced that a Party Congress will assemble on Oct. 5, to consider the plan. Western observers see the congress as the beginning of a drive to whip up morale for pushing the plan to completion.

Broadly the fifth Five Year Plan embraces the entire range of Soviet military-economic power. But everywhere through the report, the key role of construction is emphasized as it has been during the previous five year plans.

The first five year plans (1928-32, 1933-37) were devoted almost entirely to building basic industry. World War II took a heavy toll during the third Five Year Plan (1938-42), and many of the gains of the first two plans were wiped out. The fourth Five Year Plan (1946-50) has restored almost all losses, according to the Soviet government, and now Russia is starting out boldly on a new phase. Its goal: An over-all 70% increase in industrial output by the end of 1955.

Accomplishment of this goal may bring the military-economic strength of Russia closer to the heels of the U.S.

• **Building plans**—Significant among the provisions of the plan are those outlining the future for Soviet construction.

The plan envisions consolidation and expansion of existing building organizations; and the establishment of new ones in districts where large-scale construction is to go forward.

These organizations will be built up under control of five government agencies: The Ministry of Construction of Heavy Industry Works (iron, steel and non-ferrous metals); the Ministry of Power Stations; the Ministry of the Oil Industry; the Ministry of Construction of Machine-Building Works (plant manufacturing equipment).

It also proposes these specific improvements:

• To introduce widely "industrial methods of construction."

• To increase the capacities of plants producing structural metal sections by not less than twice over.

• To build the necessary number of big plants producing prefabricated reinforced concrete sections.

• To expand the existing district quarries and organize new ones with comprehensive mechanization of the mining and treating of stone, gravel and sand, as well as stone block of natural strata.

• To complete the mechanization of the main building jobs and to insure the transition from the mechanization of separate processes to the comprehensive mechanization of construction.

• To improve in five years the fleet of excavators by approximately 2.5 times, scrapers and bulldozers by 3 to 4 times, and mobile cranes by 4.5 times.

• To improve projecting in construction, to reduce the terms of drawing up projects, and to insure construction sites with projects and estimates in the accorded times, widely introducing master projects.

• To reinforce projecting organizations with skilled cadres.

• Manpower—To undertake the task ahead, Russia needs more engineers.

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The plan expects to double the number of people receiving technical training by the end of five years.

On the basis of introducing advanced technology, and "improvement in the organization of labor," and raising the "cultural technical level of the workers," Russia expects to increase labor productivity in construction by 55% by the end of 1955.

One main target will be to lower "the cost of construction work by not less than 20%, to reduce the time of construction, and to insure the improvement of the quality of construction."

There is one more aspect of the plan that will affect Russian construction men. The plan will increase the "mass movement" of engineers and building tradesmen.

An interesting sidelight: The plan proposes "to condemn the practice of economic organizations which underestimate the tasks of introducing new technology and mechanization of labor and which permit the incorrect use of manpower."

• **Lean years ahead**—In the summary to the plan, Russian planners say "it is necessary to increase the total volume of the state capital construction during 1951-55 by approximately 90%." But state grants to build this additional volume will be increased by only 60%. The additional 30% will be covered "at the expense of lowering the cost of construction by way of an increase of labor productivity, lowering of overhead expenditure, lowering of prices of building material and equipment."

• **Broad program**—Here is a quick run-down of major phases—given in percentages because of the Russian phobia against actual figures.

Planned increase in idustrial output: pig iron, 76%; steel, 62%; rolled metal, 64%; coal, 43%; oil, 85%; electric power, 80%; tractors, 19%; calcines soda, 84%; caustic soda, 79%; synthetic rubber, 82%; cement, 220%; timber, 56%; paper, 46%; cotton goods, 61%; leather footwear, 55%.

Planned increases in transportation: Railways, 35% to 40%; river, 75% to 80%; sea, 55% to 60%; road, 80% to 85%; air, not less than 100%; pipeline, 500%. An example of what this means in terms of construction: The plan envisions building and reconstructing roads, covering them with a hard surface, by an increase of 50% over the 1946-50 plan.

NORTHBOUND SIDE OF KING ST.—Showing glass masonry wall and station name signs (which are to be enlarged), and two rails of track in position.

OPEN CUT WORK—Showing building of Rosedale station, near beginning of open cut section. It will have a 500-ft loading platform.

Toronto rapid transit subway pushed toward completion

Canada's first rapid transit subway under Yonge Street, Toronto, is expected to be completed on schedule by the end of 1953 and be in operation by January, 1954. All major construction on 3¾ miles of the 4¼-mile subway will be completed by October of this year, and the remaining mile will be finished by late fall, 1953. While no figure is available yet on complete cost it will be close to $45 million, according to present contracts, as against $30 million estimated in 1945.

The line runs north from the city's business center, partly under the street and partly in private property parallel to Yonge St.

With most of the underground concrete work completed, principal visible operation is on the open cut sections and stations. The underground section of the subway covers about half the route from the downtown terminus at the Union Station to Bloor Street, where it goes open cut, with a few underground sections where the subway crosses from right-of-way east of Yonge Street to right-of-way on the west side of the street.

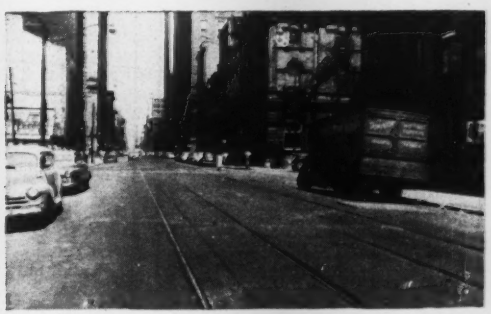
The biggest construction job on the subway now is on the last mile, which is being handled by two contractors and includes the switching yard, maintenance shops and two stations, as well as a bridge across six streets where the subway runs in open-cut section. The switching yard, which also holds the workshops, is from 25 to 30 ft below street level. To stabilize a wet sand formation in the big yard, subdrainage pipe was installed in a grid system one foot below groundwater line, using about 20,000 ft of pipe varying from 6 to 18 in. in size. Some of this pipe had to be placed as deep as 12 ft below the yard area.

Walls surrounding the yard area are of reinforced concrete and vary from 25 to 35 ft in height. Foundations for repair shops are of reinforced concrete, while structures will be steel and brick, with steel sash. Included in the yard area is its own heating plant.

Stations outside the downtown area will have surface bus terminals, where passengers will be able to change from or to subway and trolley buses or surface streetcars without crossing any traffic. These stations are in various stages of construction. They will provide shelter but will be unheated except in cashier and concession booths. In the underground subway structure

(*Continued on page 52*)

RIP NG UP Yonge St., Corner Yonge and Wellington Sts. Steel truss beams rest on steel piles driven to bedrock. Across steel beams a wooden flooring of 10 by 10-in. beams was laid to carry streetcar and motor traffic.



YONGE AND WELLINGTON STS.—Corner replaced with asphalt road after subway was completed below street level. The street railway tracks will be taken up when subway is in operation.

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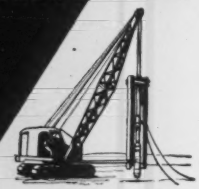

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To date about 6,000 ft of track have been laid on the northbound side of the principal underground section. The southbound side has been left free of track to allow trucks to deliver equipment for finishing the underground stations. These are all finished in glass-base masonry, with a different color scheme at each station, to allow passengers to identify stations by color, as well as by name. This color scheme even applies to the terrazzo station floor and non-skid tile strip at platform edge. The stations and entire length of subway will be lighted with fluorescent tubes.

Open-cut stations, like the underground stations, will have 500-ft loading platforms to allow eight cars, each 54 ft long, to load and unload at once. These stations will have covered platforms and covered passages across tracks, with enclosed waiting rooms at street level for connection to buses.

Construction on the subway started in September, 1949, on the downtown section. This was done by the cut and cover method, with one or two blocks opened up at a time, to allow traffic to flow as near to normal as possible (ENR June 29, 1950, p. 36). In the open cut section various types of grasses and small trees are used on sloping banks to hold the soil and for ornamental purposes.

While the bulk of structural and reinforcing steel was bought in Canada and the United States, some was also obtained from Germany and Luxembourg. Most cement, lumber and other equipment was bought in Canada. Rapid transit cars were ordered in England, 104 at $8,000,000, of a wider design than in use elsewhere, with three sets of double doors on each side.

Supervising the design of the subway, along with engineers of the municipally-owned Toronto Transportation Commission, is the Chicago firm of DeLeuw, Cather & Co. The TTC chief engineer is W. H. Patterson.

Toronto Transportation Commission is doing all its own track laying and installation of all signal equipment.

List of materials used and details on underground work procedure attached.

List of Contractors

Name	Subway Section	Amount	Start	Finish*
Pitts, Johnson, Drake & Perini, Toronto	Contracts S1, S2, S2A, all underground. From Union Station to Alexander Street.	$10,000,000	Sept., 1949	Oct., 1952
	Contract S6, from Imperial Street to and including Eglinton terminal. All open cut.	$ 3,200,000	Jan., 1952	Oct., 1953
Rayner Const. Ltd., Toronto	Contracts S3, S4, S5. From Alexander Street to west side Yonge St., opposite entrance to Mount Pleasant Cemetery. S3 and S5 almost entirely underground. S4 all open cut.	$ 7,000,000	June, 1950	Oct., 1952
Mannix-McNamara Const. Co., Toronto	Contract S5A, open cut, including switching yards and maintenance shops, from end S5 to Imperial Street.	$ 3,000,000	Jan., 1951	Oct., 1953
Foundation Co. of Canada Ltd., Toronto	11 of 12 stations (12th on Contract S6.) Complete stations, including ventilating equipment, and surface stations.	$ 4,000,000	Nov., 1951	Dec., 1953

* Approximate completion dates.

GOOD FRIEND President Truman met Wilson (right) with Adm. A. W. Radford in 1950. He was told about the turndown of federal aid for approach roads. Aid has since been approved.

Engineer-mayor of Honolulu wins long fight for road tunnel

When he was 26, John H. Wilson halved the bid of his nearest competitor and, for $37,500, built the 1½-mile Mt. Pali highway up the face of a 12,000-ft cliff between Honolulu and windward Oahu.

The road is still the shortest link between two areas, and a tourist attraction that awes thousands of visitors to Hawaii each year.

And now that he's 80, Honolulu's mayor Johnny Wilson is going to match his early feat by building the first traffic tunnel connecting the two areas.

After a five-year fight, he finally has the financing he needs—a $6 million general obligation bond issue, ½-cent increase in the Honolulu motor fuel tax, and federal aid for the approach roads.

The first $3 million worth of bonds will go on sale this month and the mayor expects to call for bids on his favorite project immediately afterwards. Construction is slated to start before the end of the year.

The tunnel will be a horseshoe-shaped bore about 2,750 ft long and 30 ft wide with a maximum arch height of about 23 ft.

Completion is scheduled for the end of 1954 and Johnny Wilson will go before the voters this fall asking for one more two-year term as mayor to finish the job.

His tunnel fight has been the theme of successive re-elections every two years since 1946. The route, federal aid, general obligation bond financing and fuel tax money took that long to achieve.

While Wilson's city government planned a tunnel route through the unopened Kaliki valley 2 mi north of his Pali road, territorial officials fought for a tunnel on the Pali route.

• **Both sides win**—By the final decision, both tunnels will be built. The territory already is moving ahead with new and straighter approaches to Wilson's 54-year-old cliff route and eventually will build a series of tunnels rather than one long one. And the first of the series will be Wilson's one-shaft bore through the cliff to the north, perhaps the last major achievement in the life of a truly fabulous citizen.

Wilson was born in Honolulu Dec. 15, 1871, of Scotch, English, Hawaiian and Tahitian ancestry. His father was a close adviser to the last queen of Hawaii, Liliuokalani, and it was she who sent Johnny to Stanford University, where he was an engineering classmate of Herbert Hoover.

As a boy, Wilson dived for pennies in Honolulu harbor. Later he shipped out to sea for several years and when revolution toppled the Hawaiian monarchy and Wilson found himself on the wrong side of the political fence, he turned showman for a time—managing the Royal Hawaiian Band on a tour of U. S. cities in an effort to gain sympathy for Liliuokalani.

In 1896, Johnny Wilson returned to the islands and began his career as an engineer—startling the entire community when he and Lou M. Whitehouse teamed up to undercut old, established firms on the Pali road bid. In the years that followed, Wilson built the first macadam roads on Maui and Kauai, and the Honolulu outfall sewer.

• **Into politics**—He also got into politics. He became Democratic national committeeman from Hawaii, attended all the national conventions from 1912 through 1948 (except 1924) and, in 1920, was moved up from Honolulu city engineer to mayor when the former mayor died.

He served as mayor from 1920 through 1926, again in 1929-30 and was re-elected in 1946. Between 1930 and 1946 he was postmaster of Honolulu and territorial welfare director.

In 1946, he formed the Wilsonite Brick Co., the only island firm that makes red clay brick, and also ran for mayor—mainly on the issue of getting the tunnel built.

He won, and he's still winning. When he was turned down for federal aid, he got the military to point out the importance of a second road across (or through) the mountains, and also got words of encouragement when President Truman visited in 1950 and saw the areas involved.

Resident engineer named

Joseph Patterson of Colorado Springs, Colo., is the new resident engineer of the Fort Randall Dam project at Pickstown, S. D.

At Fort Randall Dam, Patterson replaces John C. Hays, now area engineer at Gavins Point Dam.

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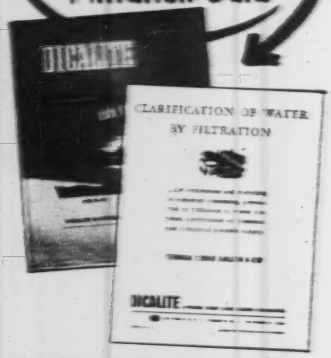

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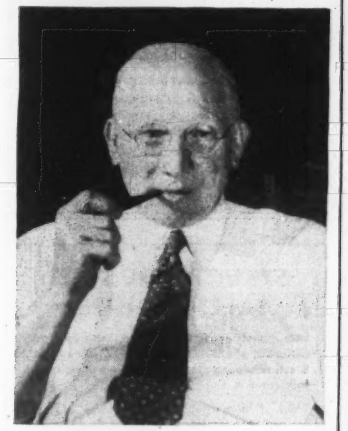

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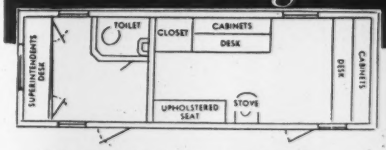

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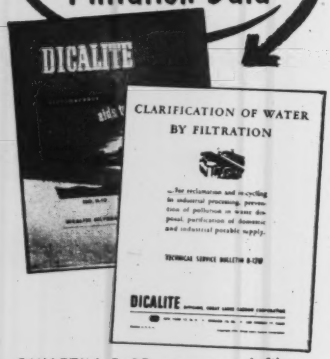

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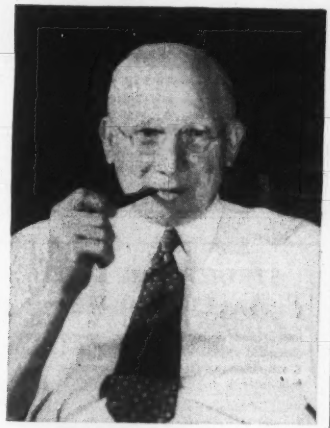

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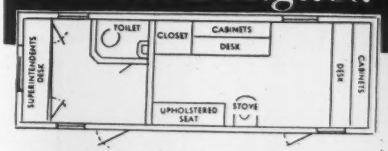

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POSITIONS VACANT

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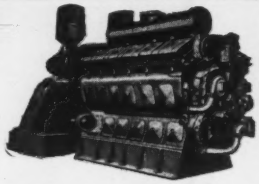

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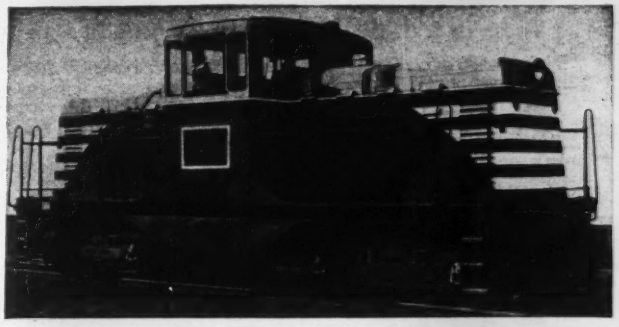

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OFFICIAL PROPOSALS

APPEAR HERE EACH THURSDAY. PROPOSAL ADVERTISEMENTS ACCEPTED UP TO 10:30 A.M. FRIDAY FOR THE ISSUE DATED THE FOLLOWING THURSDAY.

Bids: October 7, 1952

Housing Project

The Housing Authority of the City of Los Angeles, California, will receive sealed bids from financially qualified bidders for the construction of 964 units of a 1110 dwelling unit permanent Low-Rent Housing Project, known as Imperial-Compton, Cal 4-13. Bids to be opened at 2:15 P.M., Pacific Standard Time on October 7, 1952.
Bids will also be received for the construction of a complete 200 dwelling unit permanent Low-Rent Housing Project, known as Estrada Courts, Cal 4-20. Bids will be opened at 2:15 P.M., Daylight Saving Time (1:15 P.M., Pacific Standard Time) on September 26, 1952.
Necessary forms, plans and specifications are available to qualified bidders by depositing $100.00 per set, deposit to be refunded upon return.
All General Contractors interested in bidding on these two projects are invited to apply by contacting the Housing Authority of the City of Los Angeles, California, at 1401 East 1st Street, Los Angeles 33, California, telephone ANgelus 2-2121.

HOUSING AUTHORITY OF THE CITY OF LOS ANGELES, CALIFORNIA
By: Howard L. Holtzendorff, Secretary

Bids: September 11, 1952

Soil Explorations—SM-39A

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 a.m., Eastern Daylight Saving Time, on September 11, 1952 by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for

SOIL EXPLORATIONS AND FOUNDATION INVESTIGATIONS AT VARIOUS SITES ON THE NEW YORK STATE THRUWAY, HUDSON SECTION, SUBDIVISION 7, SUFFERN TO HARRIMAN, CITY OF SUFFERN AND TOWNSHIP OF RAMAPO, ROCKLAND COUNTY, WHICH CONSTITUTES CONTRACT NO. SPEC. SM-39A.

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, N. Y.

(b) J. S. Bixby, District Engineer, Pleasant Valley Road, Poughkeepsie, N. Y.

(c) Charles Schaefer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.
The Engineer's estimate of cost for this work is $34,525.00.
Proposal for this contract must be submitted in a separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $1727.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instruction to Bidders".
The right is reserved to reject any or all bids.

B. D. Tallamy
Superintendent of Public Works

Bids: September 11, 1952

Soil Explorations SM-40A

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 a.m., Eastern Daylight Saving time, on September 11, 1952 by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for

SOIL EXPLORATIONS AND FOUNDATION INVESTIGATIONS AT VARIOUS SITES ON THE NEW ENGLAND THRUWAY, POST ROAD TO LARCHMONT, TOWNS OF NEW ROCHELLE AND LARCHMONT, CITY OF NEW ROCHELLE, WESTCHESTER COUNTY, WHICH CONSTITUTES CONTRACT NO. SPC. SM-40A

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, N. Y.

(b) J. S. Bixby, District Engineer, Pleasant Valley Road, Poughkeepsie, N. Y.

(c) Charles Schaefer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.
The Engineer's estimate of cost of this work is $19,910.00.
Proposal for this contract must be submitted in a separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $1,000.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instruction to Bidders".
The right is reserved to reject any or all bids.

B. D. Tallamy
Superintendent of Public Works

Bids: September 18, 1952

Soil Explorations—SM-44

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 A.M., Eastern Daylight Saving Time, on September 18, 1952 by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for

SOIL EXPLORATIONS AND FOUNDATION INVESTIGATIONS AT VARIOUS SITES ON THE NEW YORK STATE THRUWAY, MOHAWK SECTION, SUBDIVISIONS 1 AND 2, MONTGOMERY COUNTY LINE TO WESTERN AVENUE, AND CATSKILL SECTION, SUBDIVISION 5, STYLEBARRCK ROAD, ALBANY AND SCHENECTADY COUNTIES, WHICH CONSTITUTES CONTRACT NO. SPEC. SM-44.

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, New York.

(b) G. L. Nickerson, District Engineer, 353 Broadway, Albany, New York.

(c) Charles Schaefer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.
The Engineer's estimate of cost for this work is $24,200.00.
Proposal for this contract must be submitted in a separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $1210.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instruction to Bidders".
The right is reserved to reject any or all bids.

B. D. TALLAMY
Superintendent of Public Works

Bids: September 23, 1952

Shavertown Bridge Piers and Abutments

CONTRACT 415

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall Street, New York City, until 10:00 A.M., Eastern Standard Time, on Tuesday, September 23, 1952, for Contract 415, for the construction of the piers and abutments of the Shavertown bridge, in the Town of Andes, Delaware county, New York. The bridge will cross the valley of the East Branch of the Delaware river at a point about one mile east of the village of Shavertown. The piers and abutments will be constructed of reinforced concrete and partly faced with granite, all as set forth in the specifications.

No bid will be received and deposited unless accompanied by a certified check upon a National or State bank, drawn and made payable to the order of the Comptroller of the City of New York, in the amount of fifty thousand dollars ($50,000.00), for the proper execution of the contract.

At the above place and time the bids will be publicly opened and read. Pamphlets containing information for bidders, forms of bid and contract, specifications, contract drawings, requirements as to surety, etc., can be obtained at the office of the Chief Engineer, Room 1311, at the above address, upon application in person or by mail, by depositing the sum of five dollars ($5.00) in cash or its equivalent for each pamphlet. Within 30 days following the award of contract or rejection of bids, the full amount of such deposit will be refunded for each pamphlet submitted as a bid and a refund of four dollars ($4.00) will be made for each other pamphlet returned in acceptable condition. Arrangements will be made whereby prospective bidders desiring blueprints of the contract drawings for their own use may secure same, the cost thereof to be paid by them. For further particulars, apply at the office of the Chief Engineer at the above address.

IRVING V. A. HUIE, President, RUFUS E. McGAHEN, EDWARD C. MAGUIRE, Commissioners, Board of Water Supply; RICHARD H. BURKE, Secretary.

Read the Official Proposal Columns of ENGINEERING NEWS-RECORD This Week and Every Week

OFFICIAL PROPOSALS

Bids: September 30, 1952

Contract No. 10

WEST VIRGINIA TURNPIKE COMMISSION

Sealed proposals will be received by the West Virginia Turnpike Commission for:

The work to be done under this Contract consists in performing the required grading and drainage for approximately 3.0 miles of the West Virginia Turnpike including the relocation of approximately 0.2 miles of side roads. This work is located between the North Portal of the Standard Tunnel, mile 68.3, and the Town of Miami, mile 71.3, Kanawha County, West Virginia, and is in connection with the construction of the West Virginia Turnpike in the State of West Virginia.

The principal items of work include:

	Approximate Quantity
Clearing and Grubbing	82 Acres
Excavation (all types)	1,650,000 C. Y.
Embankment	732,000 C. Y.
Concrete	3,600 C. Y.
Reinforcing Steel	203,000 Lbs.
Culvert Pipes and Underdrains —3600 Pipe	4,000 Lin. Ft.
Concrete Cribbing	16,400 Cu. Ft.

Proposals will be received at the office of the West Virginia Turnpike Commission, 1340 Wilson Street, Charleston 5, West Virginia until 9:00 A.M., Eastern Standard Time, and thereafter at the House of Delegates Chamber, State Capitol, Charleston, West Virginia until 10:00 A.M., Eastern Standard Time, on September 30, 1952, at which time and place said proposals will be publicly opened and read.

Contract documents may be seen and may be inspected by prospective bidders during office hours, after September 8, 1952, at the office of Howard, Needles, Tammen & Bergendoff, 804 Greenbrier Street, Charleston, West Virginia, and at the offices of the Engineers, Gannett, Fleming, Corddry & Carpenter, Inc., 123 Forster Street, Harrisburg, Pennsylvania, and at 6218 Penn Avenue, Pittsburgh 6, Pennsylvania, and at Chesapeake, West Virginia.

Contract plans and specifications will be furnished for Fifteen Dollars ($15.00) for each set, which is not refundable, upon application to Howard, Needles, Tammen & Bergendoff, 804 Greenbrier Street, Charleston, West Virginia. Mailing Address: P. O. Box 5266, Capitol Station, Charleston, West Virginia. Cross Sections are bound separately and will be furnished for Forty Dollars ($40.00) for each set. Make checks payable to Howard, Needles, Tammen & Bergendoff.

Proposals must be made upon the proposal forms furnished by the Commission in the manner designated in the Specifications, and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and the number of the contract on the outside, and must be accompanied by a CASHIER'S or CERTIFIED CHECK drawn to the order of the West Virginia Turnpike Commission FOR NOT LESS THAN FIVE (5) PER CENT OF THE AMOUNT OF THE PROPOSAL, but not less than $500.00 nor more than $200,000.00 and must be delivered at the place designated above on or before the day and hour named. Copies of the proposal form to be used for submitting proposals, and of the special addressed envelope are furnished in detached form with the contract documents.

The contract will be awarded or the proposals rejected within thirty (30) days from the date of opening proposals. The right is reserved to reject any or all proposals, and to waive any or all formalities.

WEST VIRGINIA TURNPIKE COMMISSION
D. Holmes Morton
Chairman

August 27, 1952

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Invitation No. DS-3788) will be received at Denver, Colorado, until October 7, 1952, for furnishing two oil-pressure, actuator-type governors with pumping equipment for controlling the wicket gate and runner blade operations and regulation of 9,400-horsepower, 150-rpm turbines for Nimbus Power Plant, Central Valley Project, California. Delivery is desired within 540 days. For particulars, address Bureau of Reclamation, Building 53, Denver Federal Center, Denver, Colorado.

OFFICIAL PROPOSALS

Bids: September 18, 1952

New York State Road Work

STATE DEPARTMENT OF PUBLIC WORKS, Albany, N. Y.—Pursuant to the provisions of the Highway Law, and Article 2, Title 9 of the Public Authorities Law, and special provisions for projects financed with federal aid funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time on Thursday, September 18, 1952 by Henry A. Cohen, Director, Bureau of Contracts & Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects: Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts & Accounts, Albany, N. Y., and at the office of the District Engineers noted below, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City. The deposit for plans and proposal forms for each contract is indicated below. A refund will be made in full to bidders for the return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
		DISTRICT No. 2				
		LACY KETCHUM, Dist. Engr., 109 No Genesee St., Utica, New York				
Montgomery	RC 52-96	Auriesville-Glen, S. H. 1959	2.39	Asp. Conc. Ty. 1A, Opt.	$3,200 Plans $10	$59,000.00
		DISTRICT No. 5				
		C. R. WATERS, Dist. Engr., 65 Court St., Buffalo, New York				
Erie	GISP 52-2	Grand Island State Parkway, (South Parkway) GISP 51-1	2.44	Landscaping	$1,400 Plans $10	$25,500.00
		DISTRICT No. 6				
		H. F. BRUMM, Dist. Engr., State Office Building, Hornell, New York				
Steuben	RC 52-94	Canisteo-Whitesville Pts. 6 & 7 State Highway 8265-8265A	4.66	Bit. Mac. Rd. Mix	$4,500 Plans $10	$81,000.00
		DISTRICT No. 7				
		C. C. CASSELL, Dist. Engr., 444 Van Duzee St., Watertown, New York				
Lewis	FARC 52-77	Copenhagen-Lowville, Pts. 1 & 2 State Highway No. 1020-847 Proj. F-564(3), F-1043(2)	8.38	Asp. Conc. Ty. 1A, Opt.	$22,000 Plans $10	$405,000.00
Jefferson	DA 52-4	Dry Hill Access Rd. (Town Rd.) Project No AD-4	1.15	Fdtn. Crse. ROB Grav.	$500 Plans $10	$9,022.50
		DISTRICT No. 8				
		J. S. BIXBY, Dist. Engr., Pleasant Valley Road, Poughkeepsie, New York				
Ulster	CT 55-6 ST 52-21	New York State Thruway-Catskill Section-Sub. 3 (Whiteport-Kingston Pt. 2); A Town Rd.; Co. Rd. 42 and Service Drive	2.58 Thy. 1.97 Acc.	9" Cem. Conc. 2 @ 25' Wide = 2.48 Mi. Asp. Conc. Ty. 1A, Opt. = 0.49 Mi. DST Graded Gravel = 0.31 Mi. F. C. Gravel = 1.23 Mi. Misc. Work = 0.04 Mi. Hy. Sep. Alpha I-Beam 260.5'	$111,000 Plans $50	$2,017,000.00
		DISTRICT No. 9				
		F. W. DONOVAN, Dist. Engr., 71 Frederick St., Binghamton, New York				
Sullivan	RC 52-97	Monticello Village, S. H. 5490 Monticello-Woodbourne, Pt. 1, S. H. 8153	5.06	Asp. Conc. Ty. 1A, Opt.	$7,500 Plans $10	$138,000.00
		DISTRICT No. 10				
		J. J. DARCY, Dist. Engr., Little E. Neck Rd. & Montauk Hy., Babylon, Long Island, New York				
Kings	FABQE 52-1	Brooklyn-Queens Expressway (Cont. 16) (Proj. U-1066(9)	0.80	Demolition of Bldgs.	$30,000 Plans $10	$510,000.00
Suffolk	FARC 52-92	Smithtown-Fort Salonga, Pt. 1 S. H. 1048-A Proj. F-566(5)	1.96	Asp. Conc. Ty. 1A, Opt. = 1.95 Mi. Misc. Work = 0.01 Mi.	$14,000 Plans $10	$254,000.00

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to the "Controlled Materials Plan" of the National Production Authority as well as to regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders".

When optional types are permitted on contracts with federal funds, bidders must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated.

The right is reserved to reject any or all bids.

B. D. TALLAMY
SUPT. OF PUBLIC WORKS

U. S. Government

BID INVITATIONS ARE NOW AVAILABLE for the furnishing of labor and materials and performance of work for completion of the United States Power Plant, Switchyards, and Appurtenant Works at Falcon Dam on the Rio Grande below Laredo, Texas. Work consists of installing turbines; generators; governors; hydraulic equipment; switchyards; metalwork; electrical equipment and installations; heating, cooling and ventilating systems; tower approach span and miscellaneous installations. Plans and specifications, including bidding schedules, priced at $20.00 each set. Send certified check, made to Treasurer of the United States, to the United States Commissioner, International Boundary and Water Commission, P. O. Box 1859, El Paso, Texas. Bids to be opened at El Paso 10 a.m. October 24, 1952.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Invitation No. DS-3793) will be received at Denver, Colorado, until October 16, 1952, for furnishing three 8,400-horsepower, 225-rpm, vertical-shaft, single-runner, fixed-blade, propeller-type hydraulic turbines for Little Porcupine Power Plant, Missouri-Souris Division, Missouri River Basin Project, Montana. Delivery point: Frazer, Montana. Delivery is desired in 720, 780, and 840 days. For particulars, address Bureau of Reclamation, Building 53, Denver Federal Center, Denver, Colorado.

U. S. Government

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. NOTICE IS HEREBY GIVEN that sealed bids on Specifications No. 703C-278 for furnishing labor and materials and performing all work for the rehabilitation of Fort Laramie Canal Desilting Works near Whalen, Wyoming, North Platte Project, Wyoming-Nebraska, will be mailed to P. O. Box 280, Casper, Wyoming, or delivered to the office of the Bureau of Reclamation in time for the public opening at 10:30 a.m., Mountain Standard Time, September 16, 1952, at the office of the Bureau of Reclamation, Reclamation Center, Casper, Wyoming.

Copies of the standard forms and of the specifications may be obtained from the following offices of the Bureau of Reclamation: Avery A. Batson, Regional Director, Building No. 46, Denver Federal Center, Denver, Colorado; and I. J. Matthews, District Manager, P. O. Box 280, Casper, Wyoming. No charge for copies of the specifications and drawings furnished for bidding purposes; for all others $0.25 per copy, not returnable. Payments should be made by check or money order payable to the Treasurer of the United States.

(More proposals on following page)

OFFICIAL PROPOSALS

Bids: September 30, 1952

Sand Drains and Surcharge Fill for Buildings No. 152, 153 and 154

PORT NEWARK
CONTRACT PN-170.002

Sealed proposals for the installation of sand drains and the placing of surcharge fill for Buildings No. 152, 153 and 154 at Port Newark will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 8th Ave., New York 11, until 2:30 P.M., Tuesday, September 30, 1952, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Engineer of Materials, Room 1110, and copies will be furnished upon deposit of $25 per set. Deposit to be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt should then be delivered to the Engineer of Materials who will furnish the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than 30 days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman

New York, September 11, 1952

Bids: September 25, 1952

PORT AUTHORITY BUILDING
ALTERATIONS IN FROM 900
PHASE I

CONTRACT EXD-130.002

Sealed proposals for performing alterations in Room No. 900 in the Port Authority Building will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 8th Ave., New York 11, until 2:30 P.M., Thursday, September 25, 1952, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Engineer of Materials, Room 1110, and copies will be furnished upon deposit of $25 per set. Deposit to be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt should then be delivered to the Engineer of Materials who will furnish the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than 30 days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman

New York, September 11, 1952.

Bids: September 23, 1952

Macopin Road

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Commissioner for:

Construction of Macopin Road, beginning at a point one hundred and eighty-seven (187) feet south of Wooley Road and ending at the Union Valley Road, West Milford Township, Passaic County, Federal Aid Secondary Project No. S-97(4). Length 2.558 miles.

Estimated:
1,607 cu. yds. Roadway Excavation—Earth
1,400 cu. yds. Roadway Excav.—Road & Subsurface Rock
5,990 cu. yds. Borrow Excavation
4,453 tons 2" Bituminous Concrete, FA-BC-1
39,691 sq. yds. 3" Mod. Pen. Macadam, Inter. Course
5,560 tons Stone
96 cu. yds. Concrete
7,936 lin. ft. Drainage
69 units Inlets & Manhole
5,726 lin. ft. Wire Rope Guard Fence

Bids for the above will be received at the office of the State Highway Department, Assembly Room, Room 140, in the State Highway Office Building, 1035 Parkway Avenue, Trenton, New Jersey, on Tuesday, September 23, 1952, at ten o'clock (10:00 A.M.—EASTERN STANDARD TIME), eleven o'clock (11:00 A.M.—DAYLIGHT SAVING TIME), and will be opened and read immediately thereafter.

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must also submit a revised financial statement and statement of plant and equipment with their bid.

OFFICIAL PROPOSALS

NOTE: The proposed project is a "Federal Aid Secondary Project" authorized by the provisions of Title 27 of the Revised Statutes of New Jersey and supplements and by P. L. 769, 81st Congress, and is to be performed in accordance with the special provisions and requirements of the Bureau of Public Roads, Department of Commerce, as outlined in the specifications, which provisions require that labor be employed from lists furnished by the State Employment Service, Fulton & Paterson Streets, Paterson, New Jersey. The attention of bidders is directed to the special provisions covering subletting or assigning the contract. The minimum wage paid to all common labor employed on this contract shall be $0.75 per hour. The minimum wage paid to all intermediate grade of labor employed on this contract shall be $1.00 per hour. The minimum wage paid to all skilled labor employed on this contract shall be $1.50 per hour.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, New Jersey, and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 139, State Highway Office Building, 1035 Parkway Avenue, Trenton, New Jersey. Bids must be made upon the standard proposal forms in the manner designated in the standard State Highway specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten per cent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be considered informal and will not be opened.

The right is reserved to reject any or all bids.

Signed: R. J. Abbott
State Highway Commissioner

Bids: September 23, 1952

CONSTRUCTION OF LIBERTY STREET
RELIEF SEWER SPRINGFIELD,
MASSACHUSETTS

Sealed bids for constructing relief sewer will be received at Room 326, City Hall, Springfield, Mass., until 12:00 noon Eastern Daylight Saving Time on Tuesday, September 23, 1952.

Project involves about 2,325 ft. of intercepting sewer varying in size from 30 in. to 48 in.; 850 ft. of 6-, 8-, and 12-in. vitrified-clay connections; manholes; junction chambers; and appurtenant work.

Drawings and contract documents may be examined at office of Metcalf & Eddy, Engineers, 1300 Statler Bldg., Boston, Mass., and examined and obtained at office of Supt. of Dept. of Streets and Engineering, City Hall, Springfield; deposit $10.

Bid security, certified check or bid bond for 5% of bid price. Successful bidder must furnish 100% performance bond.

Minimum wage rates and employment conditions on public work are applicable.

CITY OF SPRINGFIELD,
MASSACHUSETTS
By its BOARD OF SUPERVISORS
DEPARTMENT OF STREETS AND
ENGINEERING
Charles A. Bailey, Jr.
Superintendent

Bids: September 30, 1952

Sewerage System

TOWN OF ELMIRA, NEW YORK

Sealed proposals for the construction of a sewerage system for Sewer District No. 1 will be received by the Clerk of the Town of Elmira, Chemung County, New York, at the Town Hall, 1223 West Water Street, Elmira, New York, until 1:30 P.M. Eastern Standard Time, September 30, 1952, at which time they will be publicly opened and read.

The complete project will consist of Sections 1 and 2. Section 1 includes approximately 45,000 lineal feet of sewer varying in size from 8 to 10 inches. Section 2 includes approximately 45,000 lineal feet of 8 to 15-inch sewer, a pumping station and an ejector station.

OFFICIAL PROPOSALS

Bidders may submit either one proposal for both sections of the work, or separate proposals for such section or sections as the bidder may select. Plans and Contract Documents may be examined at the office of the Town Clerk, Town Hall, 1223 West Water Street, Elmira, New York, or at the offices of Gibbs & Hill, Inc. Pennsylvania Station, New York, New York, and copies thereof may be obtained upon deposit of $20.000 for each section.

TOWN BOARD
OF THE TOWN OF ELMIRA
By: Clinton J. Case
Town Clerk

September 3, 1952

Bids: October 15, 1952

Contract 2
Easterly Intercepting Sewer

CITY OF ELIZABETH, NEW JERSEY

Sealed proposals for the construction of Alterations and Additions to the Sewerage System will be received by the Board of Public Works of the City of Elizabeth, New Jersey, at a meeting to be held in the Council Chamber at the City Hall at 2:00 P.M., E.S.T., on Wednesday, October 15, 1952, and then publicly opened and read. No proposal will be accepted after said hour. Proposals will be received on Contract 2, Easterly Intercepting Sewer.

Information for Bidders, Proposal forms, specimen Contract, Plans, Specifications, and other pertinent Contract Documents may be examined at the office of the City Engineer, City Hall, Elizabeth, New Jersey, between the hours of 10 A.M. and 4 P.M. daily except Saturdays, Sundays and holidays and obtained upon making a deposit of Fifty ($50.00) dollars, which will be refunded to bidders within thirty (30) days after the proposals are opened and upon return of the data undamaged.

Extra copies of specifications may be obtained at the cost of Twenty ($20.00) dollars each and extra sets of plans may be obtained at the cost of Twenty-five ($25.00) dollars each, which sums will not be refunded. Extra sheets may be obtained at the cost of One ($1.00) dollar each which sum will not be refunded.

Prospective bidders will be required to fill in answers in Questionnaire of Financial Statement which is authorized by State Law and which must be approved by the Board of Public Works before bidders are eligible for bidding. Questionnaire forms may be obtained at the office of the City Engineer.

No proposal shall be considered unless accompanied by a Bid Bond of a corporation acceptable to the City, or a cashier's check or a certified check upon some good and acceptable bank, in the penal sum of 10% of the total amount of each bid as a guarantee that if the contract upon which the bidder has bid shall be awarded to said bidder, he will enter into a contract for the work and do so within the time stipulated in the Notice of Award for said work and failing in this so to do the bidder and surety shall forfeit to the City of Elizabeth, the amount of said Bid Bond or check. The Bid Bond shall be executed by the bidder and surety company on form furnished by the City.

A bidder to whom a contract is awarded shall furnish a Performance Bond on a surety company duly licensed in the State of New Jersey, in the sum of 100 per cent of the amount of the contract, conditioned upon the faithful performance of the terms of the contract.

The successful bidder will be required to comply with all State Laws governing the execution of Municipal contracts in the State of New Jersey.

The Board of Public Works reserves the right to reject any and all bids as it may deem best for the interests of the City of Elizabeth.

BY DIRECTION OF THE
BOARD OF PUBLIC WORKS.
George F. Cummings
Clerk, Board of Public Works.

CONTRACTORS WATCH THIS SECTION
for New Projects
Publish your announcements thru the "Proposal Section" of Engineering News-Record and get their bids.

GYROSCOPIC EQUIPMENT mounted on a station wagon is being used in California to make fast road surveys.

Gyroscopes speed road surveys

More than 4,000 miles of California highways have been surveyed during the past few months by means of road surveying gyroscopic equipment developed especially for that purpose. Surveys of another 5,500 miles are under way or scheduled.

Data being collected in this way are made available to the Automotive Safety Foundation for inclusion in a second study of California highway deficiencies, which the foundation is making for the California Legislature.

The instruments used are all mounted in a station wagon. They are an odometer, reading to 0.001 miles, and two gyroscopes, one installed horizontally and one vertically, making possible the measurement of azimuths to the nearest degree and measurement of grades and superelevations to the nearest percent. Grades and superelevation may be checked by two inclinometer tubes which are mounted in the vehicle.

The odometer works off the regular speedometer connection and has a reset, preset, and a backup registering dial. The vertical gyroscope is an adaptation of that used in the automatic-landing-control of aircraft.

Two men operate the equipment in the field. The party chief acts as driver and selects all the points at which observations are to be made. At these points he reads the various instruments and the assistant records all the data on a form especially designed so that subsequent procedures are facilitated.

James T. McWilliam, assistant highway engineer in the highway department's highway planning-survey section, developed the methods used in evaluating the data collected by this equipment.

Experience gained in the operation of the "gyro car" indicates that:

(1) Accuracies of 0.2% can be reliably expected.

(2) Accuracies of the 0.5% to 0.9% may be reliably expected on the closure of traverses calculated. (By the application of a factor in the tabulating processes the error of closure can be eliminated.)

(3) Grades can be reliably estimated to within 0.5%.

(4) The field operation phase can be done at a rate of about 5 mph.

(5) The combined costs of operating the equipment in the field and of processing the field notes mechanically are well under $10 per mile of road.

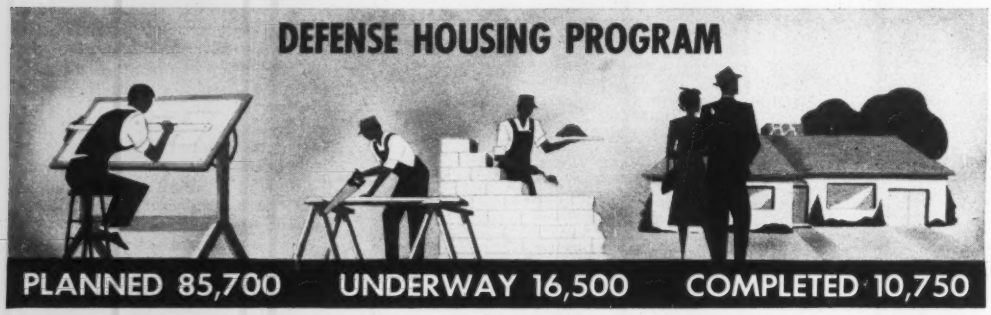
(6) The time taken to plot the tabulations and to prepare a reproducible copy, varies considerably, depending on the topography. Early figures indicate that a mile can be plotted in about three hours.

Mr. McWilliam states the accuracy of the results of the gyro traverse, which is the name given this technique, indicates that it compares favorably with the accuracies that might be expected of stadia survey.

"It is anticipated," Mr. McWilliam added, "that new uses will develop as the existence of the vehicle is made known."

McWilliam was one of several highway department planning staff engineers who participated in the development of the equipment and in perfecting its use in the field.

ALL INSTRUMENTS to be read by the operators are mounted in front of the driver's seat. Instruments shown are: A, Odometer; B, Horizontal gyroscope; C, Superelevation and grade dials; D, Inclinometer tube.



Defense housing program calls for 200,000 units

Recent authorization of $900 million to finance a government takeout market for defense housing mortgages gives the final push to a program that has moved ahead spasmodically for 18 months.

Before the program is completed, private builders will be called upon to erect more than 200,000 houses for sale or rent to defense workers and military personnel.

How far the program has come is indicated by Aug. 20 figures of the Housing and Home Finance Agency.

Up to that date the agency had programmed nearly 85,000 dwelling units in 182 critical defense housing areas. This programmed housing is about three-fourths in rental units and one-fourth in units for sale.

By Aug. 20, more than one-third of all the programmed units, something over 27,000, had been placed under construction in 152 areas. Of that number, nearly 10,750 had been completed.

Most of the progress has been made since the Defense Housing Act was signed Sept. 1, 1951. It was the authorization in that act of $200 million to the Federal National Mortgage Association for precommitments to buy defense housing mortgages that really got the program rolling.

Another big help in the same bill was the adding of Title IX to the National Housing Act, allowing FHA insurance of defense housing mortgages up to 90% of appraised value.

Mortgage insurance alone was not enough to satisfy the lenders. As the builders, bankers and insurance companies had told Chairman Burnet R. Maybank and his Senate Banking Committee earlier this year (ENR Feb. 14, p. 44), lenders hesitated to take the risks involved in defense housing, even with liberal insurance on guaranteed terms. The long-term outlook for such houses, in their estimation, was too uncertain.

• **Fannie Mae needed**—What the program needed, lenders said, was precommitment by Fannie Mae to buy defense housing mortgages. Then a lender could make construction loans and complete a mortgage on a property with complete assurance that he could recover full value on his paper through sale to Fannie Mae.

The $200-million Fannie Mae authorization was more than used up by the end of the year, the final date set by the 1951 law for making advance commitments. In fact, the agency had many applications in process that it could not accept. Congress later authorized an additional $52 million to take care of applications received up to Dec. 28, 1951.

These authorizations got the program off dead center, after six months of stagnation.

In March of 1951, the Defense Production Administration had begun certifying critical defense housing areas, and the HHFA and the Federal Reserve Board had relaxed credit controls for programmed housing in such areas, to encourage construction.

This incentive proved less than enough to get defense housing started; the program hung fire until Congress primed the money market by authorizing Fannie Mae to make advance commitments for purchase of defense housing mortgages.

The defense houses being started today are largely the result of that priming last winter. Again this year, after the $252 million had been used up, there followed another lull of several months until Congress passed the Housing Act of 1952, signed July 14. This law authorized $900 million more.

HHFA Administrator Raymond M. Foley and Fannie Mae President J. Stanley Baughman think that $900 million in precommitment authority will take care of the bulk of the program. Defense housing mortgages under advance commitment by Fannie Mae have been averaging about $8,000. The first $252 million was used to cover commitments for 31,802 mortgages.

At an average value of $8,000, the $900 million recently authorized will take care of 112,500 more. Added to those previously covered, the total comes to more than 140,000.

It is possible that less than the available $900 million will be taken up in advance commitments and later in mortgage purchases by Fannie Mae. Mortgage sales to Fannie Mae relieve market pressure and add stability. They pump additional money into the market by returning cash to lenders for investment in other mortgages.

In testimony before congressional committees, Foley estimated that HHFA would program 118,000 defense housing units by the end of 1952. With less than 30,000 to go at the end of August, the agency was well on the way to meeting the estimate.

Foley also estimated that defense housing would be needed in 350 critical areas. Programming so far has reached 182 areas, a little more than half of the estimated total. Some of these areas have already received supplemental programs. To Aug. 20,

there had been 47 of these additions to initial programs. There will be more, increasing further the number of housing units for the areas programmed at present.

Overall, there had been no dearth of builder applications to construct defense housing. Reports from 169 areas with 82,351 programmed units showed applications from builders wanting to erect nearly three times that number. Up to Aug. 20, FHA offices had approved applications for just under 78,000 units in those areas.

San Diego is an example of the changed picture on applications. In the spring of 1951, when HHFA started programming for that city, there were few applicants to build the houses.

Builders generally agreed that no one could undertake the houses under the cost and rental limits set by HHFA. But the mortgage market apparently was the critical factor.

Today, the three 1951 San Diego programs, totaling more than 7,000 rental units and more than 1,800 sales units, have all been taken up. Applications by builders have run 2½ to 1 on rental units and 5 to 1 on houses for sale.

Areas near new atomic energy plants were among the first to be declared critical. Paducah was one of these that got off to a most unpromising start in the early summer of 1951. Apparently no one wanted to build defense housing there.

Paducah's record now is somewhat better, but still not good. Rental housing (515 units) had been taken up, and most of it is under construction. But sales housing is going begging, even though FHA has gone the limit by placing no restrictions on price. Builders have applied for only 76 of 485 programmed sales units; these have been approved and are under construction. Labor conditions and shortage of home builders may have hampered progress on Paducah plans.

With the program of permanent housing erected by private builders for rental or sale to defense workers and military personnel there should be mentioned another of different character — temporary government-owned housing to shelter families in the same categories. This housing is of mobile or portable types.

So far, in three appropriation bills, Congress has voted $87.5 million that can be used for government-built temporary housing. Some $35 million has been expended to date by the Public Housing Administration for more than 9,200 units. About 7,000 of these are trailers. They go into locations that are definitely temporary in character.

Money out of the same $87.5 million appropriated could be used by the HHFA to build permanent housing in places like Paducah, where builders fail to apply within 60 days to undertake advertised defense units. The law allows such action. But HHFA never has taken that course, and never expects to. The threat of government-built permanent housing, a bugaboo to builders when the Defense Housing Act was passed last year, has become an almost forgotten ghost.

School building boom predicted

A boom in statewide school construction in Connecticut during the next three years was forecast Aug. 28 by the State Public School Building Commission.

In a report to Gov. John D. Lodge, the committee said construction during the next three years will more than double new buildings constructed since 1945.

The report said that 93 towns in the state are planning to construct new schools valued at $113 million. The schools will house 63,800 students.

The figure for estimated construction is in contrast with 193 projects costing more than $51 million completed by towns with the help of the state since the end of World War II.

Elementary school projects will cost approximately $60.6 million as compared with high school construction of about $52.6 million. Already under way but not completed are 90 building projects to cost $48 million.

• **Progress report**—The commission reported that during the fiscal year ended June 30, there were 42 towns that completed 68 school building projects. Of that amount, more than $4 million was financed through state aid which is made in annual installments.

Despite ambitious plans for construction in the next three years, 23 towns report inability to finance their projects under the state law which limits local borrowing to 10% of the town grand lists. These towns will have to apply for state help as "hardship" cases under the state program.

• **Urge easier borrowing**—In an effort to release the financial brakes on future construction, the commission recommended that the 10% statutory limit on local borrowing be lifted.

As a means of encouraging development of school units which are "educationally sound and adequate as well as economically sound," the commission also recommended that extra "financial incentive" be offered by the state to boost regional school development.

The commisison also forecast an ever-growing need for construction of large secondary schools as the big crop of elementary pupils moves into the higher grades.

Toll bridge projects advance in Washington

Development of a program for financing one toll bridge in the State of Washington has been ordered while a feasibility survey has started for a second.

A. C. Allyn and Blyth & Co., Chicago investment firms, have agreed to develop a program for financing a second floating bridge across Lake Washington, east of Seattle, for a fee of $56,000 on the $12.5-million estimated cost.

The program will be developed with the provision the bridge can be built by a bond issue to be retired by revenue from tolls, under jurisdiction of the Washington Toll Bridge Authority.

Traffic on a first bridge across the lake is reaching the saturation point, leading to studies for the second structure.

The Tudor Engineering Co., of San Francisco, has been retained by the Allyn firm to conduct a feasibility survey for a bridge across the Spokane River, in Spokane.

The toll bridge authority also figures in this project, cooperating with the City of Spokane.

Cement plant makes start on perpetual motion

A production record, not in volume, but in continuous operation, may be claimed by the Spokane Portland cement plant in the Spokane, Wash., Valley.

W. B. Neill, president, reports that the plant has been running 24 hours a day, seven days a week, for the past four years without a single shutdown.

"Butler parking plan" withdrawn

The City of St. Paul, Minn., has lost out on a $2.5-million parking plan which eventually would have handled 2,400 cars.

Walter Butler of Walter Butler, Inc., St. Paul, who last December offered the St. Paul city council the so-called "Butler Parking Plan," has withdrawn the proposal because city commissioners asked for more time to consider four other proposals by private capital to construct parking facilities in the downtown loop.

The parking problem in the St. Paul loop area is as critical as any in the country. Downtown merchants, who foot most of the city's tax bill, are up in arms because lack of parking facilities is driving customers to outlying districts.

Last December the Butler firm proposed to design, acquire sites and finance up to $2.5 million worth of loop parking facilities. Butler, in tendering the offer, said the facilities could be constructed without charging them against taxes.

His proposal was this:

- Construction immediately of facilities for about 575 cars in the vicinity of Seventh and Robert streets, in the heart of the loop, and for another 425 cars in the plateau area around Sixth and Wabasha or St. Peter streets, the other end of the loop. Additional space would be acquired elsewhere for a total of 1,200 cars. Space would be acquired later for another 1,200 vehicles.
- The company would design and write the specifications for the facilities, charging the city the usual architects' fee. It would then negotiate for, and acquire the sites.
- The city would then issue bonds to pay for construction. These securities would be redeemed through receipts from the parking facilities. Further, the Butler firm itself offered to buy the bonds or find buyers for them, with the city privileged to sell the securities at lower rates than the company.

• **Plans**—Under the plan, the city would contract for the construction work after bids were taken. The Butler firm would pay for a special traffic survey, by an independent firm of traffic engineers, to check a study already made by the company.

According to the prospectus, the parking fees would pay for the facilities, with charges of 25 cents for the first hour and 15 cents for each additional hour, with a $1.50 maximum.

Operation would be either by the city or by a management firm. The city would own the facilities after the bonds were paid off.

This time there was quick approval of the proposal by various council members as well as by merchants' groups which have been clamoring for parking facilities in the downtown area.

As the plan developed, there was talk of including a bus terminal along with the parking ramps, and that, too, seemed to meet with general favor. Completion time of the entire project was estimated at from eight months to a year.

The hedges on the proposition were whether the city had authority to own and operate parking garages and whether such facilities could be run on a tax-free basis.

Nevertheless, last June, the city council voted informal approval of the Butler proposal but cautioned the sponsor not to rush into expensive preliminary preparations.

• **Private enterprise**—Meanwhile, owners of private parking facilities bestirred themselves, even as merchants continued to demand a solution to the problem. Several said they were willing to go ahead—provided they did not have to buck city-owned parking ventures.

On June 10, Butler appeared before the city council and gave the commissioners 60 days in which to take definite steps toward implementing his company's plan.

On Aug. 8, he reappeared before the council. But also present were four others who said they had plans. Only one of the four indicated he would go ahead with construction of additional facilities regardless of what was done with the Butler plan. The other three said they would scrap their plans if the Butler proposal is adopted.

A motion was made to accept the Butler plan, but another commissioner moved to suspend all action for several weeks. When this motion passed 6-1, Butler informed the council that he was withdrawing his firm's proposal.

He did it with these words: "The real issue is whether St. Paul gets 1,200 parking spots immediately, which we offer—or something less, like 200."

• **Other plans**—The four proposals of "private enterprise," several seeking some sort of tax relief, however, were:

- United Properties, Inc., affiliated with Hamm Real Estate and Brewing Co., construction of facilities at Sixth and St. Peter streets where there is now surface parking, to include two underground parking levels, a first floor shopping center and a roof parking area. Spokesmen said they would have cost figures in two weeks. They said National Garages, Inc., of Detroit, designer and operator of parking facilities, has been engaged to help with plans.
- Jack Geller, operator of a parking lot at Robert Street and Kellogg Boulevard, construction of a corner ramp facility.
- John D. Barwise, real estate operator, use of a corner at Seventh and Minnesota streets, site of a razed department store, to include a shopping center on the first floor and three decks above for parking 400 cars. National Garages was reported in on this one, too.
- Philip Troy, president of the Golden Rule Department Store, to enlarge its present parking facilities at Eighth and Robert streets to include a ramp garage and a bus terminal. Troy was the only one who said his plan would go ahead even if the Butler plan were approved.

Pigeonhole parking beats steel shortage

Pigeon Hole Parking, Inc., of Spokane, Wash., has teamed up with the Lift Slab Corp. of California to beat the steel shortage on construction of a six-story, 120-car pigeonhole parking unit for Standard Oil of California at Wilshire and Flower streets in downtown Los Angeles, Calif.

The work will be done by Pigeon Hole Construction Inc., a subsidiary of the Spokane firm.

To beat the steel shortage, entire floor sections of reinforced concrete will be poured at ground level and hoisted into place by the lift-slab method.

The pigeonhole parking method utilizes an under-car carriage operating on a laterally-traveling hydraulic elevator to pick up cars and stow them in "pigeonholes" at various levels.

Construction of the "racks" is skeletal, eliminating the cost of exterior walls and roofs. However, they can be installed in existing buildings where headroom is sufficient.

Franchises have been granted for erection of 20 other parking units in Washington, D. C.; 20 in the Carolinas and Georgia; 20 in Texas; one in Eugene, Ore., and three in Tacoma, Wash.

Congress revives school program

A $195-million appropriation voted by Congress in July has revived the faltering school facilities program. After a six-month lull, Federal Security Agency officials are again reserving funds for school construction in federally affected areas.

During July and August, FSA made tentative reservations of $113 million for 489 school districts in 41 states, Alaska and Hawaii.

The districts, after receiving final approval of their applications, will use the money to construct minimum school facilities for children of defense workers and servicemen.

• **Help for boom towns**—Started just two years ago, the school facilities program offers grants to local school districts that can show critical need for school buildings in defense boom towns.

Since the beginning of the program, Congress has voted $341.5 million for school aid in defense-mushroomed areas.

Not all of the programs will receive final approval. For example, from September, 1950, to June 30, 1952, FSA reviewed 1,952 applications worth $321 million.

Out of this number, FSA recommended approval for 474 applications worth $122 million. Final approval was given to 384 districts for projects worth $109 million.

Big reason for this is that the Office of Education in FSA and the Housing and Home Finance Agency have joint duties in the administration of this program.

FSA receives the applications and checks to see if they meet the minimum requirements. If they do, FSA issues a tentative approval and sends them to HHFA for checking.

HHFA then checks the applications to see if they meet legal requirements, if plans and specifications are correct, and if everything else is in order. If it is, HHFA then prepares to oversee the construction of the project.

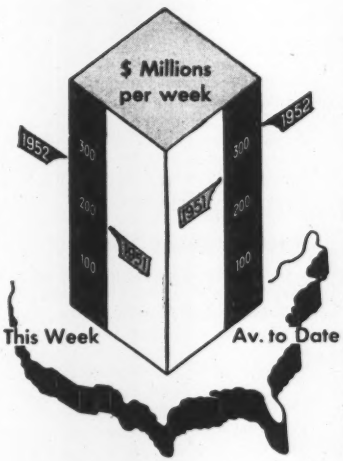
A. M. Kinney to work on new AEC project

A. M. Kinney, Inc., consulting engineers of Cincinnati, Ohio, was omitted from a list of architects and engineers who will design the Atomic Energy Commission's new Ohio valley plant (ENR, Aug. 21, p. 21).

The scope of Kinney's work on the AEC project will include: sanitary systems and some water systems; sanitary sewer systems; storm sewer system; electrical distribution; fire alarm, communications, signal and alarm system; clearing, excavating, grading and seeding; roads, walkways, drainage structures, and parking lots; railroad system, including bridges; fencing, portals, bus loading shelters; steam distribution system; and nitrogen and dry air distribution system.

Activity This Week

As reported to ENR (in millions of dollars)



Contracts by type of work

	This Week	Cumulative 37 wks. 1952	1951	% chge
Waterworks	$1.4	$160.7	$157.3	+2
Sewerage	7.4	209.3	227.0	−2
Bridges	12.3	281.5	235.1	+20
Highways	38.4	1,107.1	863.9	+28
Earthwork, waterways	2.9	351.4	378.4	−7
Buildings:				
Public	49.1	3,613.5	1,627.8	+122
Housg., pub.	4.7	496.1	551.6	−10
Housg., priv.	53.4	2,120.1	1,398.7	+52
Commercial	18.1	4,438.2	484.3	−10
Industrial	38.1	1,946.0	2,949.1	−34
Unclassified	38.8	954.4	1,283.8	−26
Total	**$264.6**	**$11,678.3**	**$10,157.0**	**+15**

NOTE: Minimum size projects included are: Waterworks and waterway projects, $34,000; other public works, $60,000; industrial buildings, $82,000; other buildings, $300,000.

ENR indexes		Base Year = 100 1913	1926	1949
Constr. cost.	Sept.	586.47	281.92	122.94
	Aug.	583.69	280.58	122.36
Bldg. cost	Sept.	424.79	229.63	120.75
	Aug.	422.36	228.32	120.06
Volume	Aug.	1,082	440	313

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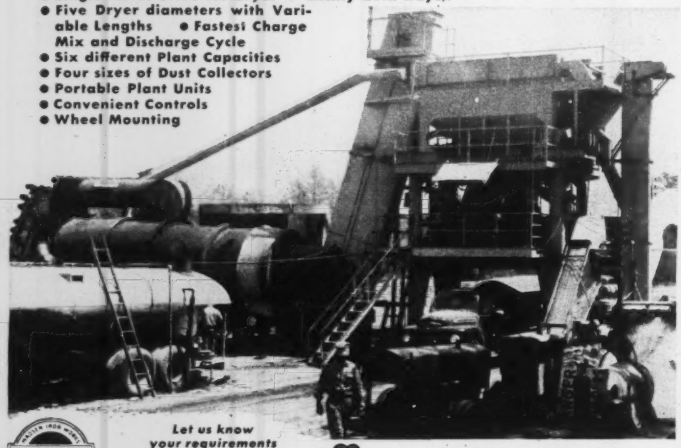

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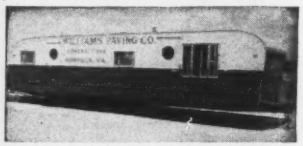

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Governor rejects road bond issue

Governor Murray, of Oklahoma, has rejected a proposal to hold a special election on a $102-million bond issue for elimination of obsolete bridges, death traps and hazards on Oklahoma highways.

Murray said he did not believe a bond issue would be the best approach to the state's highway financing problem. He added that he did not feel the bond issue would be favored by a majority of the people.

• **Montana's problem**—While Oklahoma searched for another solution to its highway problem, Montana turned up with one of its own. The governor's Committee on Interim Financing estimated the state could obtain about $1.5 million a year in additional highway revenue by tightening up on gasoline tax refunds.

A subcommittee of the group is completing work on a recommendation for submission to the 1953 state legislature. This would require renewal each year of gasoline tax refund permits.

Montana gasoline buyers who use the fuel off the highways are now required to make only one application for the refund. The subcommittee feels that by making a yearly application necessary the state would discover a number of persons are no longer eligible for the refund. In addition, the group wants to cut the present $3-million annual refund total in half.

The state gasoline tax is refunded to those who use gasoline for non-highway purposes. Others pay a state tax of six cents a gallon, all of which goes for highway construction and maintenance.

• **Texas program announced**—Meanwhile, Texas State Engineer De Witt C. Greer announced a $93-million highway program for 1953 and 1954. He explained that the two-year program has been approved by the State Highway Commission.

Test building law

A friendly suit will be filed soon to test the constitutionality of the 1951 Indiana School Building Law.

The law authorizes the state to advance money to communities for school building construction.

The suit will be filed on behalf of the Shoals community which plans construction of a new $415,000 school building.

Cleveland to vote on $54-million bond issue

The largest bond program in Cleveland's history, $54 million for capital improvements, will go before the voters in November.

The $54 million represents the new bond money needed to complete the first three years of a program for 1953-58, totaling roughly $220 million, Edmund Burke Peterson, assistant city planner reported.

Here are the separate issues to be voted on:

• **City Hospital and health centers—$3 million.** Items to be financed for City Hospital include: out-patient building costing $1.4 million; classrooms in nurses' home costing $300,000; zone heat control costing $45,000; maintenance building costing $315,000; health center to be built in new out-patient building at a cost of $50,000; health center to be built on the East Side at a cost of $400,000.

• **Welfare institutions—$1 million.** Four fireproof cottages to be built at the city-run boys' farm (juvenile delinquents) in Hudson, O., at a cost of $800,000; an addition to the school at the Blossom Hills School (female juvenile delinquents) costing $200,000.

• **Airports—$6 million.** The $6 million together with federal matching funds will enable the city to complete the passenger terminal, surrounding area and administration building at Cleveland Hopkins Airport.

The passenger terminal, area and administration building are expected to cost close to $7 million; in this is the cost of the administration building which has been estimated at $4.5 million.

Also planned for the airport are an east-west runway estimated at about $2 million; a freight terminal—$1 million and taxiways through the mat—$200,000.

Another big item listed under airport is $1 million for the extension of the E. 20th Street and E. 22d Street outfall sewers through fill for the lakefront airport, a port for small aircraft on Lake Erie. Drainage ditches are presently being used for the task.

• **Parks—$1.5 million.** Much of this will go for replacement of topsoil, drainage, walks, landscaping and fencing. None will be spent on maintenance, per se, as Ohio state law forbids the expenditure of bond money for this purpose. Such funds must come from operating levies.

A significant item in the $1.5 million is $350,000 for Gordon Park. Much of this is to repair damage and rearrange park lands and drives as a result of the freeway expansion. Some items can come under freeway expenditure, but others cannot.

Also under this come construction of parking areas and roads within the parks not intended as thoroughfares.

• **Recreation—$3 million.** In general this includes rehabilitation of existing facilities, new developments, and land acquisition, as well as construction of two new swimming pools.

• **Lakefront and shore protection—$2.5 million.** Major expenditure in this is the improvement of the central lakefront area, including a $1-million bulkhead from E. 9th Street to W. 6th and extension of W. 3d Street and Erieside Avenue. Bulkheading will be done west and north of the stadium.

Other items include completion of Marinas and Small Boat Harbors, the location of which are to be restudied.

• **Zoo—$1 million.** Besides improvements, biggest item here is $500,000 for a new pachyderm building.

• **Freeways—$6 million.** This figure will raise to $10 million the city's participation in the inner belt of the freeway system (see ENR Aug. 14, p. 47), only from W. 14th Street to Carnegie Avenue. It will include approaches and part of the future interchange with the Willow Freeway when that is completed. Total cost of the inner belt is now at $40 million.

• **Street openings and widenings—$3.5 million.** Most important projects in this are the extension of E. 79th Street to Fleet Avenue, costing an estimated $170,000, and the revamping of the presently congested University Circle area. Traffic pours into the neighborhood off Chester Avenue, Euclid Avenue, Cedar Avenue and other main arteries.

A surface interchange is to be built to eliminate the congestion problem. An elevated interchange was ruled out because of two 72-in. water mains running beneath the area. These could not be cut off long enough to permit the sinking of pier.

• **Paving—$3 million.** Paving and resurfacing of a large number of streets.

• **Bridges—$1 million.** Total bridge program for the next three years calls for roughly $3.5 million.

Deferred maintenance and reconstruction of existing bridges account for most of this program.

To the 1954 program there will possibly be added a $1-million bridge over the Pennsylvania Railroad and New York Central System tracks near the lakefront in the downtown area. This will be mainly for a proposed parcel post building.

• **Off-street parking—$2 million.** Already voted for off-street parking is $1 million which, it was hoped, will be spent this year for construction of two parking lots—one at E. 131st Street and Miles Avenue and one at E. 55th Street and Broadway.

Originally $6 million was slated for off-street parking on the bond issue. This was cut to $2 million.

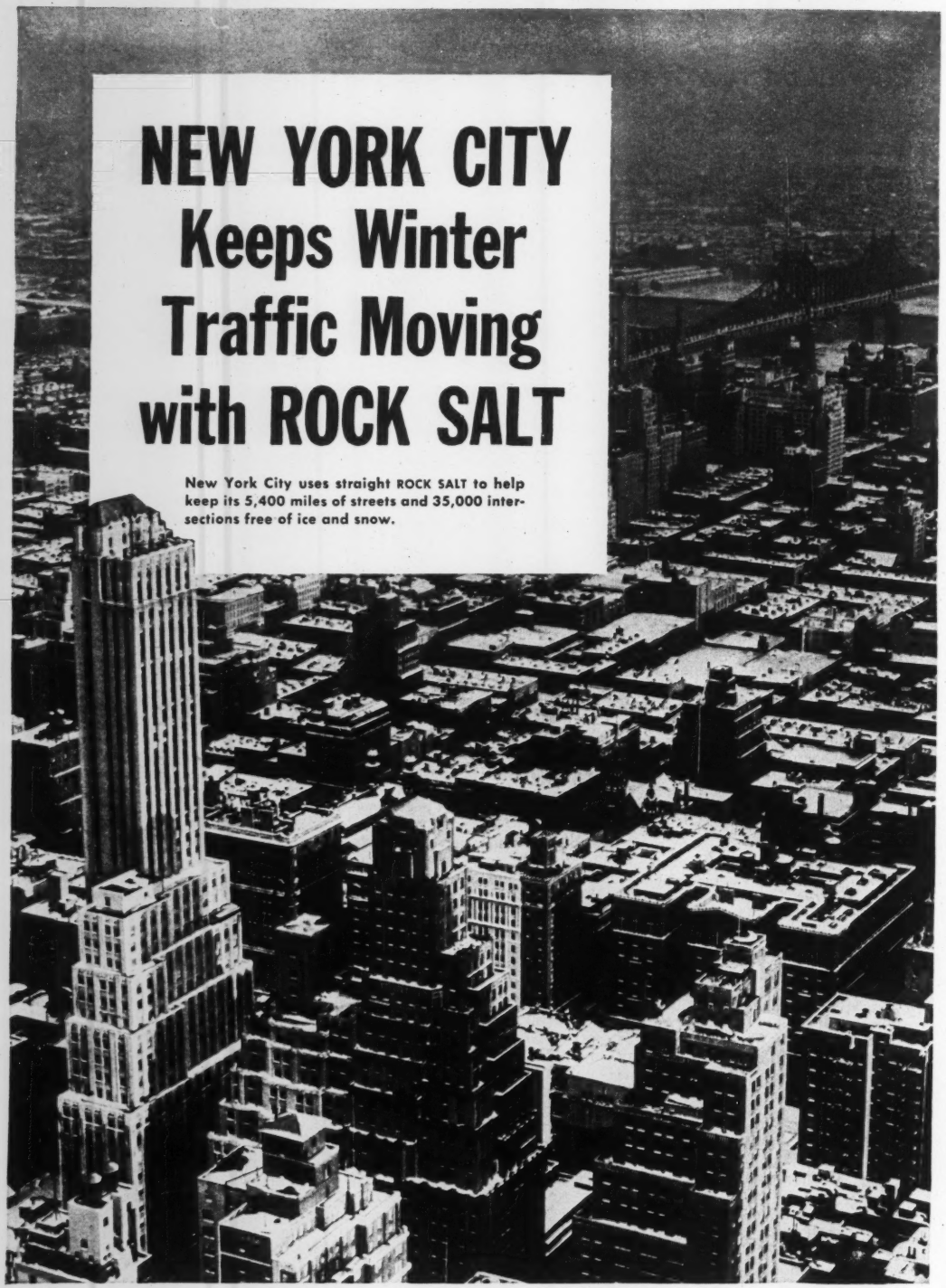
Two-thirds of the cost will be recovered by the city in 10 years. This will be done by special assessments. For each million the city spends, it will get back $67,000 a year for the next 10 years. Eventually the money becomes a rotating fund to finance other projects.

• **Sewers—$7 million.** Roughly $3 million will be spent each year for the next three in this category. About half of this will be expended on flood relief sewers.

• **Urban redevelopment—$7 million.** The report described four redevelopment projects and traced the preliminary planning history of this phase of the program.

"These four projects, if completed, will eliminate some of the worst slum areas of the city. They will provide housing for middle income groups together with neighborhood shopping centers, playgrounds and other necessary community facilities. In addition, a considerable amount of much-needed space for the expansion of the central warehouse district will be made available. Two of these four projects have been selected for earliest action because they are planned to provide a maximum amount of housing."

• **Sewage disposal (self-supported)—$6 million.** Expansion of the southerly treatment plant makes up the bulk of the six-year Capital Improvement Program for the Division of Sewage Disposal. This plant will help reduce lake and river pollution through the treatment of the wastes to be collected by the Cuyahoga River intercepting sewer system. A sludge pump building is scheduled to be started this year, followed in 1953 by a $6-million activated sludge plant. Sewage disposal charges are expected to pay for improvements in this category, but the initial investment will have to be given approval by the voters.



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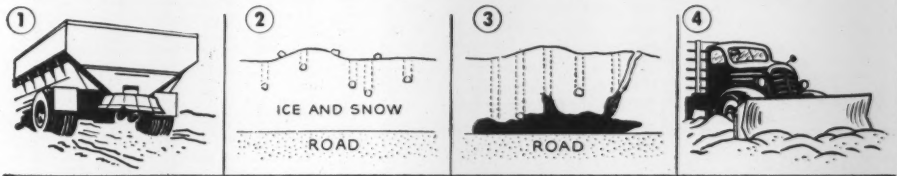

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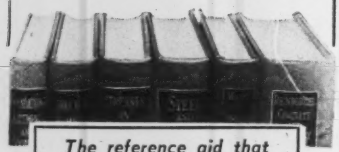

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Position NR-9-11-52

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UNIT PRICES

Sewerage work, Kentucky

A $4.5-million sewer project for the Sanitation District No. 1, Newport, Ky., consists of six river collectors, two lift stations and a sewage treatment plant. Work includes tunnel sections, packed sections, aerial sewer bridges, siphon river crossings, lift stations, and a sewage disposal plant.

Unit prices are reported here on the items which were not special to this job. Prices of the manholes, aerial sewer bridges and modifications to existing sewers are not included. There are 375 standard manholes at an average depth of 12 ft and a total cost of $318,440. Nine aerial sewer bridges consist of pipe varying from 12 to 60 in. supported on concrete piers and will cost $61,500. Under the item pipe, reinforced concrete, reinforced concrete culvert, plain concrete, or vitrified clay pipe can be used within the limits established by the specifications.

The Second Street lift station is a caisson type dry pit station, 80 ft in depth; the Banklick, a rectangular type dry pit station, 40 ft in depth.

The disposal plant has an average capacity of 22.4 mgd and provides primary treatment augmented by chemical flocculation during the summer months. Disposal of raw sludge is accomplished through filter drying and incineration. Settling and flocculating tanks are the rectangular type; the two covered sludge holding and thickening tanks are circular.

Included in the disposal plant are three buildings—lift and blower, chemical and an administration.

Vogt, Ivers, Seaman and Associates, of Cincinnati, Ohio, are the consultants.

Section B must be complete in 270 days; section C, 270 days; section D, unit 1, 270 days, unit 2, 730 days, and unit 3, 730 days. Bidders include:

1C McHugh Constr. Co., Chicago	$4,560,260
2 Foley Constr. Co., Cincinnati, Ohio	4,922,682

Bids: 5-20-52

Section B Items	Unit	Quantity	Unit Prices 1 C	2
Exc. add'l for rock	cy	30	$10.00	$10.00
direct overcut inc bkfill	cy	75	3.00	10.00
Replace conc paving	sy	100	6.00	10.00
macadam & brick paving	sy	25	4.00	20.00
gravel & cinder paving	sy	10	1.00	2.00
Pipe, 18"	lf	3,700	9.00	11.00
15"	lf	4,810	7.00	10.00
12"	lf	8,670	6.00	9.75
CMP, 12 ga., 18"	lf	60	10.00	9.00
15"	lf	75	8.00	8.00
12"	lf	320	7.00	7.00
St'd MH frame & cover	ea	57	40.00	65.00
heavy duty	ea	16	50.00	60.00
Sq. slide gates, 12"	ea	3	75.00	500.00
8"	ea	2	50.00	400.00
Concrete collar, 18"	ea	1	15.00	30.00
12"	ea	1	10.00	20.00
Conc pipe protection	cy	6	125.00	125.00
Concrete encasement	cy	10	25.00	25.00
Rem & replace exist headwall	ls	1	250.00	300.00

Section C Items	Unit	Quantity	Unit Prices 1 C	2
Exc. add'l for rock	cy	40	$10.00	$10.00
in trench	cy	750	10.00	15.00
in non-class tun	cy	350	60.00	20.00
Exc. dir overcut inc bkfill	cy	150	3.00	10.00
Replace conc paving	sy	800	6.00	10.00
macadam & brick paving	sy	600	4.00	10.00
gravel & cinder paving	sy	360	1.00	3.00
Pipe, 42"	lf	6	20.00	20.00
33"	lf	4,760	15.00	24.00
30"	lf	1,470	15.00	22.00
24"	lf	4,880	12.00	15.00
21"	lf	2,490	10.00	16.00
18"	lf	5,310	8.00	12.00
15"	lf	1,890	7.00	14.00
12"	lf	14,540	5.00	10.00
8"	lf	2,490	3.00	7.00
6"	lf	60	3.00	3.00
8" with taps	lf	220	5.00	6.00
VCP, 12"	lf	3,410	5.00	13.00
8"	lf	30	5.00	8.00
6" with elbow	lf	20	5.00	6.00
CMP, 12 ga., 24"	lf	80	16.00	16.00
21"	lf	100	15.00	15.00
12"	lf	530	12.00	11.00
8"	lf	680	10.00	9.00
16 ga., 18"	lf	110	10.00	14.00
12"	lf	70	8.00	10.00
8"	lf	10	6.00	6.00
8 ga., 30" jacked	lf	84	60.00	30.00
RCCP, tunnel-non-cls., 42"	lf	2,796	110.00	105.00
33"	lf	479	105.00	103.00
30"	lf	256	100.00	100.00
cls., 33"	lf	1,204	130.00	115.00
CMP temp outfall, 16 ga., 18"	lf	50	10.00	25.00
12"	lf	30	8.00	20.00
CIP, mech jt, place 12" *	lf	16	10.00	10.00
6" *	lf	32	10.00	8.00
House connect	ea	3	25.00	50.00
Std manhole frame & cover	ea	120	40.00	65.00
Std watertight frame & cov	ea	8	50.00	65.00
Std heavy duty fr & cov	ea	77	50.00	70.00
CI frames & covers	lb	5,000	0.40	1.00
Tide gate, 72"	ea	1	4,000.00	2,700.00
66"	ea	1	4,000.00	3,000.00
Sluice gate, 42" self cont.	ea	1	1,500.00	1,500.00
Sluice gate & hoist, 36"	ea	2	1,500.00	2,500.00
Rect slide gate, 24"x18"	ea	1	200.00	400.00
Square slide gate, 18"	ea	1	150.00	300.00
15"	ea	2	100.00	250.00
12"	ea	3	75.00	200.00
8"	ea	1	50.00	150.00
Shear gate, 12"	ea	1	100.00	250.00
6"	ea	1	75.00	200.00
Concrete collar, 24"	ea	1	15.00	100.00
21"	ea	2	15.00	75.00
Conc pipe protections	cy	43	25.00	25.00
Conc encasement	cy	9	25.00	25.00
Raising existing 12" sewer	ls	1	175.00	300.00

Section D Items	Unit	Quantity	Unit Prices 1 C	2
Exc. channel mod	cy	4,150	1.00	2.00
additional for rock	cy	250	10.00	10.00
add'l for rock in trench	cy	3,200	10.00	15.00
dir overcut incl bkfill	cy	200	3.00	10.00
Replace conc paving	sy	1,940	6.00	10.00
macadam & brick paving	sy	3,250	4.00	10.00
gravel & cinder	sy	800	1.00	3.00
Pipe, 60"	lf	13,840	45.00	40.00
48"	lf	5,880	36.00	52.00
42"	lf	840	35.00	42.00
36"	lf	1,150	30.00	38.00
33"	lf	2,550	30.00	16.00
27"	lf	300	25.00	20.00
12"	lf	2,740	15.00	14.00
9"	lf	75	10.00	4.00
8"	lf	3,300	8.00	8.00
8" with taps	lf	360	10.00	10.00
60" jacked	lf	75	100.00	70.00
48" jacked	lf	50	90.00	60.00
8" jacked	lf	20	25.00	20.00
CMP, 36"-16 ga., temporary outfall	lf	90	30.00	20.00
House connections	ea	10	25.00	50.00
Std manhole frame & cover	ea	32	40.00	65.00
Std watertight fr & cov	ea	17	50.00	65.00
Std heavy duty fr & cov	ea	69	50.00	70.00
CI frame & cover	lb	4,300	0.40	1.00
Sluice gate & hoist, 60"	ea	1	3,000.00	4,200.00
Sluice gate, self cont, 48"	ea	3	2,100.00	3,000.00
8"	ea	1	50.00	400.00
Square slide gate, 30"	ea	1	300.00	400.00
Rect slide gate, 18"x12"	ea	1	100.00	300.00
Conc pipe protection	cy	15	25.00	25.00
Conc encasement	cy	12	25.00	25.00
Conc cradle	cy	60	25.00	25.00

Section D—Unit 2 and 3 Item	Unit	Quantity	Unit Prices 1 C	2
Exc. directed overcut incl bkfill	cy	50	5.00	10.00
Second St. lift station & Licking River Cross #1	ls	1	$291,850	$340,000
Banklick lift station	ls	1	55,000	92,000
Licking River cross #2	ls	1	14,000	40,000
#3	ls	1	16,900	30,000
Piling	vf	1,410	$10.00	$7.00
Treatment plant	ls	1	$1,475,656	$1,470,000

* Place only.

CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded—First Section

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.
ELSIE EAVES, Manager *J. A. MAHONEY, Reports* *M. R. ROESSLER, Statistics*

NEW ENGLAND

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
Sept. 15, Connecticut Sept. 25, Vermont
STREETS AND ROADS
Sept. 15, Connecticut Sept. 16, Massachusetts

BIDS ASKED—BUILDINGS

Mass., Wellesley — SCHOOL — B.A. 9/25 — Town, High School Bldg., Donald H. White, chn., elementary school, Fiske Distr., Wellesley Hills. $755,000. Plans deposit $40, refundable. Adden, Parker, Clinch & Crimp, 177 State St., Boston, archts. CD 4/10.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

MASSACHUSETTS—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,
West End Iron Works, 110 Bridge Ave. Exten., Cambridge, Mass. LB $779,908, est. $750,000. superstructure Hunt's Fall Bridge over Merrimac River, Lowell. CD 7/31;
Continental Constr. Corp., 437 Main St., Lynnfield, Mass. LB $72,535, est. $69,000. viaduct repairs Commonwealth Pier, Boston. Bids Aug. 26. CD 8/13.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ White Constr. Co., 134 Newbury St., Boston, Mass. LB $1,839,000. Junior High SCHOOL, Cabot and Baich Sts., North Beverly, BEVERLY, MASS. City School Bldg. Comn., 203 Whitney Ave., Beverly, Mass. Bids Aug. 28. CD 7/30.
▲ Gerald Callahan, 1105 N. Main St., Randolph, Mass. Owner Builds. Est. $1,000,000. 100 RESIDENCES, WALTHAM, MASS. CD 8/15.
† Park Constr. Co., Inc., 40 Court St., Boston, Mass. CA $637,174, est. $600,000. convert Bldg. 1 to G. M. S. and Paraplegics Veterans HOSPITAL, WEST ROXBURY, MASS. Veterans Admin., Regional Office, 1 Beacon St., Boston, Mass. CD 8/22, under LB.
▲ Charles McLaughlin, Coolidge Ave., Somerville, Mass. Owner Builds. Est. $1,400,000. 145 RESIDENCES, WOBURN, MASS. CD 8/15.
Smith Constr. Co., 101 Water St., Derby, Conn., CA $608,000, STORE expansion, State St. at Regal Theatre, HARTFORD, CONN. W. T. Grant Stores, 142 State St., Boston, Mass. CD 7/8.
▲ Borough of Wallingford Housing Auth., Wallingford, Conn. Rejected bids Aug. 11. MR-46 HOUSING, WALLINGFORD, CONN. LB $1,087,000. CD 8/19, under LB.

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
Sept 16, New Jersey Sept. 23, Maryland
STREETS AND ROADS
Sept. 16, 23, New Jersey Sept. 18, New York
Sept. 19, Pennsylvania

BIDS ASKED—BUILDINGS

Md., Bel Air—SCHOOL—B.A. 9/24—Harford Co. Bd. Educ., Courtland St., 1 story, brick, steel Consolidated Colored School wing addn., near Havre de Grace. $750,000. Plans deposit $75. Gaudreau & Gaudreau, 330 N. Charles St., Baltimore, archts. J. L. Faisant & Assoc., 21 W. 25 St., Baltimore, struct. engrs. Egli & Gompf, 1019 N. Calvert St., Baltimore, mech. engrs.
▲ N. Y., Brooklyn—SCHOOL—B.A. 9/30—Bd. Educ., Bureau Constr., 49 Flatbush Ave. exten., Zone 1, general construction, plumbing and drainage, heating and ventilating, electrical work and lighting fixtures for New Junior High School 285, Beverly Rd. between Ralph Ave. and E. 59 St. $2,670,550. Plans deposit $27, general construction; $8, plumbing, drainage $8, heating and ventilating, $9. electrical and lighting fixtures.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ Gull Constr. Co., Inc., 33-15 Lawrence St., Flushing, N. Y. CA, $2,546,925, cont. Lt 160.007 New York Land Shaft and Land Sect. No. 1 for Third Tube of Lincoln Tunnel, NEW YORK, Port of New York Auth., 111 8 Ave., New York, 11, N. Y. Bids Aug. 26. CD 8/27, under LB.
▲ NEW YORK—Bureau Contracts & Accounts, The Governor Alfred E. Smith State Office Bldg., Albany.
Rusciano & Son Corp., 728 E. 212 St., New York, 67, N. Y. CA, $1,878,505, est. $2,250,000. 1.48 mi. elimination of grade crossings of Terrace Pl. and Central Ave. in Village of Valley Stream with L.I.R.R. PSC 5466 and 14337, Nassau Co. Bids June 26. CD 7/2, under LB.
▲ NEW YORK—Bureau Contracts & Accounts, The Governor Alfred E. Smith State Office Bldg., Albany.
Hendrickson Bros., Inc., 63 N. Central Ave., Valley Stream, N. Y., CA, $1,657,543, est. $1,660,000 3.51 mi. Conduit Blvd., Pts. 3, 3A, S. H. 1699A, 1699C 1953, F.A.R.C. 52-23, Nassau Co.; CA $723,338, est. $848,000 1.68 mi. Northern Sagtikos State Parkway N. Sag. Sp. 52-1, Suffolk Co.;
E. G. Lia & Sons Constr. Corp., New Hartford, N. Y., LB, $679,664, est. $718,000, 4.96 mi. Mayfield Village, S. H. 519 Mayfield Northville Parts 1 and 2, S. H. 368 and 541; Northville Chapmans Corners SH 362, Northville Village-North S. H. 5065, FA.RC 52-26, Fulton Co.;
Slattery Contg. Co., Inc., 46-36 54 Road, Maspeth, N. Y. CA, $1,398,842, est. $1,545,000. 2.78 mi. Greenvale-Glen Cove, Massapequa-Glen Cove, S. H. 9017, F.A. R.C. 52-36. FA.SH 52 7, Nassau Co.;
S. J. Groves & Sons Co., Empire Bldg., Syracuse, N. Y. CA, $1,167,543, est. $1,300,000. 2.46 mi. New York State Thruway-Ontario Section Subdivision 1 and 2 Ontario County Line to Tyre) and 8 intersecting roads, O. T. 52-9, S. T. 52-13, Seneca Co. Grand Total. $5,626,980. Bids June 12. CD 6/16, under LB.
▲ NEW YORK—Bureau Contracts & Accounts, The Governor Alfred E. Smith State Office Bldg., Albany.
John Arborio, Inc., W. Cedar St., Poughkeepsie, N. Y. CA, $2,259,276, 2.9 mi. access. 9.64 mi. Palisades Interstate Parkway, Pts. 1 and 2, Rte. 45—Queensboro —PIP 52-2P, Orange and Rockland Counties, CA, $713,915, est. $838,000, 11.7 mi. Claverack-Kinderhook, Pt. 1 and S. H. 1919, Claverack-Kinderhook, Pt. 2 and President Van Bureau Farm-Valatie Pt. S. H. 8497, F.A.R.C. 52-55, Columbia Co.;
C. J. Langenfelder & Son, Inc., 8427 Pulaski Hy., Baltimore Md., CA, $3,301,015, est. $3,400,000. 7.31 mi. Deposit-Hales Eddy, S. H. 5045, Hales Eddy-Hancock, S. H. 5167, F.A.R.C. 52-39, Delaware Co. Grand total $6,274,206. Bids June 26. CD 7/2, under LB.
▲ PENNSYLVANIA—State Hy. & Bridge Auth., 506 N. Office Bldg., Harrisburg,
C. W. Good, Inc., 726 Columbia Ave., Lancaster, Pa., LB, $1,414,010, 20,205 ft. divided hy. c. cons. 24 ft. wide each side of divisor. 2 rein.-con. and 1-I-beam bridges, Allentown-by-pass, Route U. S. 22 Hanover and Bethlehem Twps., Northampton Co. Bids Aug. 29. CD 8/13, under State Hy. Dpt. as owner.
† MARYLAND—Bureau P. Rds., Dpt. Commerce, 1440 Columbia Pike, Arlington, Va.
T. E. Ritter Corp., 426 York St., Norfolk, Va. LB $747,022. concrete paving, etc. 3.929 mi. from Laurel-Fort Meade Rd. to Jessup Rd., Baltimore-Washington Parkway, Proj. 1G4-H3-J3, Anne Arundel Co. Bids Aug. 28. CD 8/1.

PROJECTS COVERED

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $34,000; other public works $60,000; industrial buildings $82,000; other buildings $300,000.

Classes of Construction
(Name in order of Listing)

Water Supply	Latin America
Sewers, Waste Disposal	Public Buildings
Bridges	Commercial Buildings
Streets & Roads	Industrial Buildings
Earthwork, Waterways	Unclassified

Stages Reported

PROPOSED WORK: Including appointment of engineers or architects.
BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR.
LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects invloved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.
Dates shown are of issue in which last previous report was published.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
B.A.	Bids Asked
ENR	Engineering News-Record
CD	Engineering News-Record Construction Daily

▲† Williams Constr. Co., Inc., Middle River, Md. CA $2,282,899. expansion of Runway 6-24, Naval Air Station, PATUXENT RIVER, MD. Dist. P. Wks. Office, Potomac River Naval Command, Naval Gun Factory, Wash., D. C. CD 7/14, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ Fillmore Gardens Apartments, c/o Sellig & Finkelstein, archts., 153 Pierreport St., Brooklyn 2, N. Y. separate contracts, $3,000,000, two story, garden APARTMENT, for 340 families, 11 acre tract bounded by E. 53 St., E. 59 St., Fillmore Ave. and Ave. T, BROOKLYN, N. Y. CD 7/9.
▲† Peter Reiss Constr. Co., Inc., 105 Court St., Brooklyn, 2, N. Y., CA, $2,000,000, U. S. Army INSTALLATION, Plum Island, NEW YORK. U. S. Eng., 80 Lafayette St., New York, 13, N. Y. CD 6/19, under LB.
▲ Roaring Brook Estates, c/o Lester Cohen, archt., 41 Main St., Hackensack, N. J., Owner Builds. $1,500,000 98 HOUSES on tract, North Maple and East Glen Aves., RIDGEWOOD, N. J.

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION

▲ N. C., Charlotte—COLISEUM etc.—B.A. After 11/1—City, coliseum-auditorium, $3,000,000. A. G. Odell Jr. & Assocs., 109 W. 3 St., archts. CD 10/25/51.

BIDS ASKED—BUILDINGS

Va., Clintwood—SCHOOL—B.A. 9/16—Dickenson Co. School Bd., Clintwood, brick, concrete, masonry Clintwood High School, $575,000. Plans deposit $25. Extended date, Franz & Addkinson, 501 State & City Bldg., Roanoke, archts. CD 8/8.
Va., Norfolk—SCHOOL—B.A. 9/18—School Bd., Bank and Charlotte Sts., 1 story, masonry Chesterfield Heights Elementary School, $650,000. Plans deposit $50, J. B. Courtney, 424 W. 21 St., and Oliver & Smith, 409 Yarmouth St., archts. CD 7/2.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ State Road Dpt., Tallahassee, Fla., rejected bids July 2, constr. Los Olas Boulevard toll tunnel at Fort Lauderdale, FLORIDA, LB, $4,121,169. Will readvertise. CD 7/10, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ Barrett & Hilp, 918 Harrison St., San Francisco, Calif. CA approx. $6,000,000. 1,500,000 sq. ft. WAREHOUSE, FRANCONIA, VA. Parr Warehouse Corp., No. 1 Drumm St., San Francisco, Calif. General Services Admin., Wash., D. C., lessee. CD 6/26.
Eugene Simpson & Bro., 300 Montgomery St., Alexandria, Va. LB $771,844. Gar-Field High SCHOOL, Dumfries, MANASSAS, VA. Prince William Co. School Bd., Manassas, Va. Bids Aug. 21. CD 7/22.
Construction Service Co., Isle of Palms, S. C. CA $800,000. 97 RESIDENCES, CHARLESTON, S. C. J. C. Long, 90 Broad St., Charleston, S. C.
A. P. Hennessy & Sons, 2300 22 St. N. St. Petersburg, Fla., LB, $675,900, Mound Park HOSPITAL addns., ST PETERSBURG, FLA. City, City Hall, St. Petersburg, Fla. Bids Aug. 15. CD 7/16.
▲ Rule Consr. Co., 217 18 Ave. N., Nashville, Tenn. CA $1,016,701. 7 story MEDICAL CLINIC bldg., 21 Ave., NASHVILLE, TENN. Vanderbilt University Nashville, Tenn. CD 8/5, under LB.

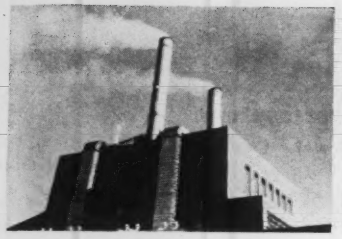
MIDDLE WEST

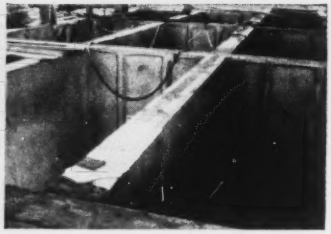
BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
September 17, Michigan
STREETS AND ROADS
September 17, Michigan

Ill., Pekin—B.A. About 10/15—City, City Hall, South Side Sewer Laterals, incl. approx. 16 mi. 8- to 21-in. sewers, 350 manholes, etc. $600,000. Crenshaw & Jost, 512 Court St., engrs. CD 7/17.

BIDS ASKED—BUILDINGS

Wis., Stevens Point—LIBRARY—B.A. 9/26—Bd. Regents of State College, Madison, 1 story, bsmnt, L-shaped 181x136 ft. library at State College, $600,000. Plans deposit $25. Foeller, Schober, Berners, Safford & Jahn, 310 Pine St., Green Bay, archts. CD 4/21.
▲ Mich., Muskegon—HOSPITAL—B.A. 10/6—Mercy Hospital, Sisters of Mercy, 1521 Jefferson St., Muskegon, brick, steel hospital addn. $1,500,000. Plans de-





PRECIPITATORS, BREECHINGS, STACKS AND HOPPERS ALL LINED WITH "GUNITE" BY CEMENT GUN CO.

Photos above show units number 1 and 2 of the new 150 m.w. steam electric station of the Pennsylvania Power and Light Company at Sunbury, Pa.

The precipitators, breechings and stacks, visible on the exterior of the building, were all lined with re-inforced "Gunite" by Cement Gun Company as were the forty coal hoppers inside the building.

Many instances of repair, remodeling and new construction with "GUNITE" are described and pictured in Bulletin A 2400. A request on your letterhead will bring your free copy by return mail.

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HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ † **Swan Constr. Co., Inc.,** 501 W. 11 St., Newport, Ky. LB $1,117,000, est. $1,281,500. A.M.C. WAREHOUSE B Gentile Air Force Base Specialized Depot, Eng. 15-029-53-16, DAYTON, O. U. S. Eng., 830 W. Broadway, Louisville 3, Ky. Bids Aug. 28. CD 7/30.

▲ **ILLINOIS**—State Div. Hys., Springfield, rejected bids Aug. 19, furnishing structural steel and cast steel for bridge U. S. 67, Cass and Schuyler Counties, LB, $1,299,895; repairs to bridge on Ill. 178, La Salle Co., LB, $219,674; erecting new steel truss bridge superstructure, wid'n existing concrete deck girder, both Ill. 43, St. Clair Co., LB, $199,269. CD 8/25, under LB.

▲ **ILLINOIS**—State Div. Hys., Springfield, rejected bids Aug. 6, bit. on soil cement base course 7.09 mi. F.A.S. 699, Cumberland Co.; LB, $171,205; c. conc. base course, bit. resurf., culvert alterations 4.78 mi. Ill. 37, Jefferson and Franklin Counties, LB, $787,288; c. conc. base course wid'n., c. conc. 1.14 mi. U. S. 136, Fulton Co., LB, $149,173; grav. bit. or crushed stone base, 4.09 mi. on F.A.S. 795, Marion Co., LB, $142,142. CD 8/11, under LB.

▲ **ILLINOIS**—State Div. Hys., Springfield, rejected bids Aug. 19, bit. 1.24 mi. Ill. 1 and 33, traffic control signals at 4 intersections, Crawford Co., LB, $182,078; base course, wid'n. 5.33 mi., c. conc. base course 5.33 mi. U. S. 34, Henry Co., LB, $273,082; bit. resurf. 14.61 mi. U. S. 34, Henry Co., LB, $268,951; c. conc. 0.31 mi. Ill. 31, approaches to railroad overhead, Kane Co., LB, $135,337; bit. resurf. 1.06 mi. U. S. 34, Knox Co., LB, $236,964; bit. resurf., c. conc., and conc. base course wid'n. 5.01 mi. Ill. 29, Marshall and Peoria Counties, LB, $724,328; bit., grav. or crushed stone base, 3.54 mi. F.A.S. 602 Pike Co., LB, $78,479; cond. base course wid'n., conc. base course 13.55 mi., truck weigh station, Ill. 116 Tazwell and Woodford Counties, LB, $593,787; bit. 2.19 mi. F.A.S. 540, Vermilion Co., LB, $178,307; bit. grav. or crushed stone base 0.85 mi. grav. or crushed stone surf. course 3.24 mi. F.A.S. 716, Fayette Co., LB, $149,385. CD 8/25, under LB.

▲ **ILLINOIS**—State Div. Hys., Springfield,
American Asphalt Paving Co., 9701 S. Torrence Ave. Chicago, Ill., CA, $952,303, bit. resurf., traffic control installations, 3.76 mi. Alt. U. S. 30, Chicago, Cook Co.;
Rockford Black Top Constr. Co., Rockford, Ill., CA, $667,547, bit. resurf. 29.989 mi. Ill. 2 Lee, Ogle and Winnebago Counties;
Rock Road Constr. Co., 5915 Rodgers St., Chicago, 30, Ill. CA, $661,525, bit. resurf. 4.98 mi. S. A. 969 (Chicago Ave.) Cook Co. Grand total $1,921,373. Bids Aug. 19. CD 8/25, under LB.

WISCONSIN—State Hy. Comn., Madison,
A. F. Keyes Co., 1254 Fairview Ave., South Milwaukee, Wis., LB, $556,316, Contract 1, grading, draining, base, bridges 12.418 mi. Sect. 1, Black River Falls-East County Line Road, S. T. Hy. 54, S 0580 (2), Jackson Co.; LB, $390,986, Contract 1, grading, drainage, bas[illegible]ridges 9.108 mi. Option B, S 0580 (2), Sectio[illegible] Jackson Co.;
Mathy & Th[illegible]n Construction Companies Consolidated, 508 Hoeschler Bldg., La Crosse, Wis., LB, $91,229, Contract 1, c. conc. 0.208 mi. Copeland Avenue Relocation, City of La Crosse, U. S. Hy. 53, Proj. U 08-3 (33), La Crosse Co.;
Rob. Vickery Co., Suamico, Wis., LB, $321,355, Contract 1, grading, draining, base 5.861 mi. Shawano-Cecil Road, S. T. Hy. 22, F 039-2 (15) Shawano Co. Bids Aug. 26. CD 8/11.

WISCONSIN—State Hy. Comn., Madison,
S. J. Groves & Sons Co., 500 Wesley Temple Bldg., Minneapolis, Minn., CA, $934,586, Contract 1, 21.526 mi. Black River Falls-East County Line Road, S. T. Hy. 54, Proj. S 0580 (2), Jackson Co. Bids Aug. 26. CD 9/4, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Brune-Harpenau Builders, Inc.,** 3075 Neisel Ave., Cincinnati, O. Owner Builds. Approx. $3,000,000. 196 one-family brick HOMES, adjacent to Karen Ave., Bridgetown, CINCINNATI, O. Joseph Allen, 4638 Glenway Ave., Cincinnati, O., engr., William Byrnes, 1659 Sutton Ave., Cincinnati, O., archt. Awarded Aug. 29.

▲ **Casto Constr. Co.,** 42 S. Fourth St., Columbus, O. CA Est. $5,000,000. Twenty-six 1 story, steel, concrete STORE ROOMS built in Town and County Shopping Center, 3600-4900 E. Broad St., COLUMBUS, O. Don M. Casto & Son, 42 S. Fourth St., Columbus, O. C. Melvin Frank, 43 W. Long St., Columbus, O., archt. CD 11/27/51.

Leonard H. Krill Co., 2169 E. 33 St., Cleveland, O. CA $950,000. 1 story, 50,000 sq. ft. FACTORY, incl. office to mfg. machine tools and jet engine parts, SOLON, O. Cyril Bath Co., 6984 Machinery Ave., Cleveland, O. Awarded Aug. 29. CD 4/29.

▲ **Carroll Constr. Co.,** 333 N. Michigan Ave., Chicago 1, Ill., CA, $3,000,000, 300,000 sq. ft. WAREHOUSE, Skokie Hy. at Buckley Rd., NORTH CHICAGO, ILL. Abbott Laboratories, 14 and Sheridan St., North Chicago, Ill. Awarded Aug. 22. CD 5/0.

▲ **N. L. Rizzo & Assoc., Inc.,** 715 Devon Ave., Chicago, Ill., Owner Builds, $2,400,000 160 HOMES, PARK RIDGE, ILL. Awarded Aug. 26.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
STREETS AND ROADS
September 19, Minnesota

BIDS ASKED—BUILDINGS

▲ † **N. M., Wingate**—BUILDINGS and MAGAZINES—B.A. 9/16—U. S. Eng., Box 1538 Albuquerque, 4 buildings, 80 magazines, Wingate Ordnance Depot, Eng. 29-005-53-2, $1,000,000. Plans deposit $125. Extended date. CD 8/11.

▲ **Ark., Fort Smith**—SCHOOL—B.A. 9/23—Fort Smith School Bd., Fort Smith, Junior High School. $1,000,000. Plans deposit $75. E Chester Nelson, Merchants Bank, Ft. Smith, archt. CD 4/23/51.

▲ **N. M., Alamogordo**—HOUSING—B.A. 9/23—U. S. Eng., Box 1538, Albuquerque, construct, manage, finance 168 duplexes, $1,500,000; 60 duplexes, $875,000; 47 dwelling units, $423,000, Holloman Air Force Base, Eng. 29-005-53-7. Extended date. CD 8/11.

▲ **Mo., St. Louis**—HOSPITAL—B.A. 9/24—St. Louis Childrens Hospital, Roy D. Kercheval, pres., 500 S. Kingshighway, Zone 10, 6 story, 35x243 ft., brick, concrete, steel hospital wing addn., with 1 story, bsmnt. section 28x125 ft., present 1, 2 and 3 bldgs. rebuild and connect to addn. $2,750,000. Extended date, Russell, Mullgardt, Schwarz, Van Hoefen, 1620 Chemical Bldg., 721 Oliver St., Zone 1, archts.,

Brussel & Viterbo, 812 Olive St., Zone 1, struct. engrs., John D. Falvey, 316 N. 8 St., Zone 1, mech. engr. CD 8/12.

▲ **Okla., Lawton**—HOTEL—B.A. 9/24—Lawton Community Hotel, Lawton, 10 story, bsmnt., steel, masonry hotel, $1,400,000, Paul Harris, 3107 Gore Blvd., archt. Dambold & Sullivan, 1611 Broadway, Oklahoma City, engrs. CD 5/16/51.

Mo., North Kansas City—WAREHOUSE, etc.—B.A. About 9/25—Hershey Wholesale Grocery Co., c/o Herman Hershman, 417 Grand St., Kansas City, 100,000 sq. ft. warehouse, docks, maintenance garage, $500,000. Kivett & Myers, 1016 Baltimore St., Kansas City, archts. CD 7/23, under Mo., Kansas City.

▲ **Tex., San Antonio**—HOUSING—B.A. 10/2—San Antonio Housing Auth., 400 Labor St., Tex. 6-12, 260 dwelling units in 65 bldgs. $2,062,500. Plans deposit $50. R. Andricks, Milam Bldg., Geo. R. Rine, 20 San Pedro St., R. W. Barnes, 702 Ogden Lane, engrs. Ford & Rogers, 228 E. Martin St., Addis E. Noonan Assoc., Am. Hospital & Life Bldg., and C. Rinard, Alamo National Bldg., archts. CD 9/5/51.

▲ **Mo., St. Louis**—HOUSING—B.A. About 12/1—St. Louis Housing Auth., Arthur A. Blumeyer, chn. and John J. O'Toole, exec. dir., 901 Washington Ave., Zone 1, 600 multiple housing units, southeast of Jefferson and Cass Aves. part of Proj. MO-15, $6,000,000, Hellmuth, Yamasaki & Leinweber, Inc., International Office Bldg., 722 Chestnut St., Zone 1, archts. CD 2/20/51.

▲ **Tex., Ballinger**—PLANT—Bids Asked—Runnels Gas Products Corp., Abilene, natural gasoline plant near here. CD 8/19.

SOON LETS CONTRACT—BUILDINGS

Minn., St. Paul—SYNAGOGUE—B.A. 9/15—Mount Zion Hebrew Congregation, L. Pistner, chn. Bldg. Comm., Summit Ave. and Syndicate St., soon lets contract 2 story, bsmnt., 32x112 ft. 80x86 ft., 52x80 ft. synagogue at temple section, incl. 2 story bsmnt., 45x265 ft. school wing, $895,000, Eric Mendelsohn, 627 Commercial St., San Francisco, Calif., archt. CD 6/28/51.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **Berger-Kyger Constr. Co.,** Higginsville, Mo. LB $102,030, foundations;

Douglas Constr. Co., 510 E. 15 St., Topeka, Kan. LB $1,125,033, erect sub-stations, etc., MISSOURI. Northwest Electric Power Co-operation, Cameron, Mo. Bids Aug. 20. CD 7/14.

▲† **U. S. Eng.,** 1709 Jackson St., Omaha, Neb. rejected bids Aug. 29, Stage IV, earthwork, Fort Randall Reservoir Proj., near Lake Andes, Inv. 25-066-53-12, SOUTH DAKOTA. LB $10,359,498. CD 7/16.

† **M. W. Watson Constr. Co.,** National Bank of Topeka Bldg., Topeka, Kan. LB $638,230, est. $611,566. training bldg., utilities, etc., Forbes Air Force Base, Eng. 23-028-54-4, TOPEKA, KAN. U. S. Eng., 601 Davidson Bldg., Kansas City, Mo. Bids Aug. 27. CD 8/20.

† **Word-Texas-Dellinger,** Box 4227, Corpus Christi, Tex. CA. $877,640, Cont. NOY 71641, heavy duty runway BEEVILLE, TEX. U. S. Govt. Officer in Charge of Constr., Naval Air Station, Corpus Christi, Tex. Bids Aug. 12. CD 8/20, under LB.

Ottinger Constr. Co., 3101 Camp Bowie St., Fort Worth, Tex., LB, $738,248, Contract 1, sewage collection system; LB, $229,625, Contract 2, sewage treatment plant, HALTOM CITY, TEX. Gown, Haltom City, Tex. Bids Aug. 26 CD 8/14.

BUILDINGS

LOW BIDS AND CONTRACTS

Sioux Falls Constr. Co., Box 773, Sioux Falls, S. D. CA. general contract;

C. J. McDermott, Sioux Falls, S. D., CA. mechanical contract;

Electric Supply Co., 217 N. Phillips St., Sioux Falls, S. D., CA electric contract 2 story, bsmnt., 99x142 ft. newspaper PLANT Minnesota Ave. and 10 Sts., SIOUX FALLS, S. D. Sioux Falls Argus-Leader, 210 W. 9 St., Sioux Falls, S. D. Total approx. $600,000. Bids Aug. 26. CD 8/13.

Marchant Brothers & Balay, Box 545, Mercedes, Tex., CA. $705,832, est. $500,000. Fort Brown Memorial CENTER, BROWNSVILLE, TEX. Fort Brown Memorial Center, City of Brownsville, Brownsville, Tex. Bids July 31. CD 8/7, under LB.

▲ **Shell Oil Co. & Associated Companies,** Shell Bldg., Houston, Tex. Owner Builds $1,175,000, gas compressor PLANT, CUERO, TEX. CD 11/30.

Leslie F. Crockett Constr. Co., Box 4036, Austin, Tex., LB, $639,990, 47,000 sq. ft. elementary SCHOOL, FORT HOOD, TEX. Community Facilities Service of Home & Finance Agency, 1024 T & P Bldg., Fort Worth, Tex. Bids Aug. 2. CD 8/2.

▲ **T. C. Bateson Constr. Co.,** 618 Irwin-Keasler Bldg., Dallas, Tex., LB. $1,397,800, Tex. 7-4, superstructures for 254 DWELLING UNITS for thirty-four 2 story bldgs., GALVESTON, TEX. Galveston Housing Auth., Galveston, Tex. Bids Aug. 28. CD 7/23.

Book Constr. Co., 2630 Ferris St., Dallas, Tex. CA. $635,560, John S. Armstrong, Elementary SCHOOL, HIGHLAND PARK, TEX. Highland Park Independent School Distr. Highland Park, Tex. Bids July 15. CD 7/24, under LB.

▲ **The Austin Co.,** M & M Bldg., Houston, Tex. CA $2,750,000, 2 story, 150,000 sq. ft. rein.-con. DEPARTMENT STORE, air-conditioned, ALBUQUERQUE, N. M. Fedway, Inc., 1680 Broadway, New York 19, N. Y.

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
September 24, 25 California
STREETS AND ROADS
September 24, 25 California

BIDS ASKED—BUILDINGS

▲ **Calif., San Diego**—SCHOOL—B.A. 9/23—San Diego Unified School Dist., San Diego, Kearny High School.

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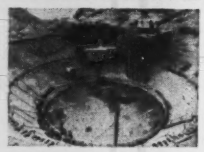

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$1,000,000. Plans deposit $15. Frank L. Hope, 1447 6 Ave., archt. CD 11/16/50.

▲ **Calif., Los Angeles**—REHABILITATION CENTER—B.A. 9/24—City, City Hall, rehabilitation center for Los Angeles Police Depot in Boquet Canyon. $1,000,000. Van Dyke & Barnes, 2234 Beverly Blvd., engrs. CD 11/2/48.

▲ **Ariz., Phoenix**—DWELLINGS, etc.—Bids Asked—L. B. Holaday, Dean Hawn, and Jno B. Mills, Mercantile Securities Bldg., Dallas, Tex. 600 dwellings $5,000,000; shopping center, $550,000. CD 8/19.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **Macco Corp.**, 14409 S. Paramount Blvd., Paramount, Calif., CA, $3,151,590, 130 mi. 9 in. oil products line from Salt Lake City, Utah to Juniper, Idaho;

Engineers Ltd., 225 Bush St., San Francisco, Calif., CA, $4,848,600, 200 mi. 8 in. oil products line, Juniper, Idaho to Boise, Idaho, UTAH and IDAHO, Salt Lake City Pipe Line, North Salt Lake City, Utah. CD 5/23.

▲ † **Bennett Campbell Inc.**, Seaboard Bldg., Seattle 1, Wash., LB $1,335,788, bachelor officers quarters bldg., 4 airmen's dormitories, mess and administration bldg., motor maintenance shop, utilities, Fairchild Air Force Base, Inv. 53-2, SPOKANE, WASH. U. S. Eng., City-County Airport, Walla Walla, Wash. Bids Aug. 28. CD 7/16.

▲ **OREGON**—State Hy. Comn., Highway Bldg., Salem.

Guy F. Atkinson Co., 5315 N.E. 101 St., Portland, Ore. CA $1,112,370. piers, approaches, deck for Wilsonville Bridge, West Portland-Hubbard Hy., FAP BFI 303 (6), Clackamas Co.;

Hannan Bros. Co., Builders Exchange Bldg., Portland, Ore. CA $60,080. two viaducts, Pacific Hy., FAP BFI 189 (11), Douglas Co. Bids Aug. 19.

▲ **OREGON**—State Hy. Comn., Highway Bldg., Salem.

Funderburk & Sloen, Sutherlin Ore., CA $1,345,874. grading, paving 4.72 mi. Oregon Coast Hy., FAP BF 110 (7), Lincoln Co. Bids Aug. 18. CD 8/11.

CALIFORNIA—State Div. Hys., 120 S. Spring St., Los Angeles,

Ukropina, Polich, Kral, 201 E. Las Tunas Dr., San Gabriel, Calif., CA, $958,841, grading, paving, overcrossings, etc., on Santa Ana Freeway between Lakewood Blvd. and D Road, Los Angeles Co. Bids Aug. 7, awarded Aug. 26. CD 8/14, under LB.

▲ † **H. B. Nicholson, J. L. Ferry, N. P. Van Valkenburgh**, 117 E. Colorado St., Pasadena, Calif., CA, $1,526,479, Schedule 1, airmen's dormitory bldgs., mess, administration, etc., Area YY, Groups A & B ENG 53-106, CASTLE AIR FORCE BASE, CALIF. U .S. Eng., 180 New Montgomery St., San Francisco, Calif. Bids Aug. 19, awarded Aug. 26. CD 8/27, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

Smith-Phillips Co., 7042 S.W. Macadam St., Portland, Ore., LB, $643,333. George Atkinson Elementary SCHOOL, PORTLAND, ORE. School Dist. 1, 631 N.E. Clackamas St., Portland, Ore. Bids Aug. 27. CD 8/4.

▲ † **Gust K. Newberg Constr. Co.**, 2040 N. Ashland St., Chicago, Ill., CA, $17,912,000, Item 1, Alternate A Veterans Administration HOSPITAL, LOS ANGELES, CALIF. Veteran Administration, Munitions Bldg., Wash., D. C. Bids Aug. 19. CD 8/21, under LB.

▲ † **L. C. Anderson Co.**, 3040 Hancock St., San Diego, Calif., CA, $2,595,000, addn. TRAINING FACILITIES at Naval Training Center, NOY 71061, Spec. 32615, SAN DIEGO, CALIF. Dpt. Navy, San Diego, Calif. Bids Aug. 5, awarded Aug. 26. CD 8/11, under LB.

▲ **California Builders**, 5525 Marshall St., Oakland, Calif., CA, $1,000,000, HOSPITAL and CLINIC, WALNUT CREEK, CALIF. Permanente Foundation, Broadway and MacArthur Blvd., Oakland, Calif. Bids Aug. 18, awarded Aug. 26. CD 8/26, under LB.

ALASKA

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ † **J. H. Pomeroy & Co., Inc.**, 333 Montgomery St., San Francisco, Calif. LB, $9,949,000, est. $11,734,-859 forty-three 8-family quarters in 2 story frame buildings with concrete bsmnt., ENG 95-507-53-9, Elmendorf Air Force Base, ALASKA, U. S. Eng., 3013 Arcade Bldg., Seattle, 1, Wash. Bids Aug. 29. CD 8/18.

▲ † **J. H. Pomeroy**, 333 Montgomery St., San Francisco, Calif. CA, $6,867,000, 800 ft. steel tower, underground wires and two 6x38 ft. helix house; Spec. 32962, also work at Cold Bay, under Spec. 31607 and at Shemya under 3106 Adak Naval Station, ALASKA P. Wks. Office 17th Naval Dist., Kodiak, Alaska, Bids July 2. CD 7/10, under LB.

▲ † **ALASKA**—Bureau P. Rds., Juneau.

Babler Bros. & Rogers, 4617 S. E. Milwaukie St., Portland, Ore., CA, $1,323,340, 54.5 mi. Seward-Anchorage hy. Proj. A5, Bids Aug. 22, CD 9/2, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ † **Lytle & Green and S. Birch & Sons**, Securities Bldg., Seattle, 1, Wash., LB, $10,059,561, est. $10,479,374 steel frame POWER PLANT extension on rein.-con. fdn. with 6 boilers and 4 generators, 61x23 ft. steel frame and masonry warm storage bldg., etc. ENG 95-597 52-6, Ladd Air Force Base, ALASKA. U. S Eng., 3013 Arcade Bldg., Seattle, 1, Wash. Bids Aug. 27. CD 8/7.

CANADA

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
September 17, British Columbia

▲ **Ont., Port Arthur**—DOCK—B.A. 9/15—Canadian National Rys., Western Div., J. L. Charles, ch. engr. Winnipeg, Man., timber foundation piling, sheet steel pile revetments, partial fill, demolition of part of existing dock for new 600 ft. extension to present dock, $3,000,000. C. D. Howe Co. Ltd., Whalen Bldg., engr. CD 3/5.

▲ **Ont., Toronto**—B.A. 9/15—Trans-Canada Airlines, International Aviation Bldg., Montreal, Que. aircraft hangar 800 ft. long, 150 ft. deep with 150 ft. annex at Malton (Toronto) Airport. $2,000,000. Plans deposit $50 Margison, Babcock & Assoc. Ltd., 21 Richmond St. W., engr.

▲ **Ont., Toronto**—RESERVE BLDG.—B.A. 9/16—Defence Constr. Ltd., 441 Queen's Quay W., 3 story, bsmnt., L-shaped, air force reserve bldg., Avenue Road, $1,500,000. Plans deposit $100. R. P. Opie, c/o owner, regional engr. Marani & Morris, 1250 Bay St., archts.

SOON LETS CONTRACT—BUILDINGS

▲ **Ont., Toronto**—FACTORY—De Havilland Aircraft of Canada Ltd., Downsview, soon lets contract 1 and 2 story 250x750 ft., 3 story, 100x130 ft. office wing part bsmnt., concrete, steel, brick, block aircraft factory, Toronto suburb Downsview, $3,500,000. Shepherd & Powell, 57 Bloor St. W., engrs.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Dominion Constr. Co., Ltd., 150 West 1st Avenue, Vancouver, B. C., LB, $966,625, Section A, Okanogan Flood Control, comprising channel construction from Skana Lake to Okanagan Lake and control dams at Okanagan Lake and Okanagan Falls, BRITISH COLUMBIA. B. C. Government, Douglas Bldg., Victoria, B. C. Bids Aug. 14. CD 7/28.

BUILDINGS

LOW BIDS AND CONTRACTS

Foundation Maritime Ltd., 135 Lower Water St., Halifax, N. S., CA, $860,000 gun mounting refit SHOP and HEATING PLANT for Canadian Navy, DARTMOUTH, N. S. Defence Constr. Ltd., 1032 Gottingen St., Halifax, N. S. C. J. Connolly, c/o owner, regional engr. Awarded Aug. 26.

Frid Constr. Co., Ltd., 128 King St. E., Hamilton, Ont., CA, Approx. $800,000, WAREHOUSE and OFFICES, LONDON, ONT. General Motors, Diesel Ltd., Oxford St., London, Ont. CD 6/5.

▲ **Beaudoin Constr. Co.**, 108 Electric St., Ottawa, Ont., Own Forces, $800,000. 15 concrete, brick APARTMENTS, Churchill Ave. between Currell and West Hill Aves., OTTAWA, ONT.

▲ **K. J. Greene**, 18 Rideau St., Ottawa, Ont., CA, $1,002,000 twenty-three 3 story, brick, block APARTMENT bldgs., concrete fdns., just west of Island Park Dr. lying between Scott St. and Ottawa River, OTTAWA, Ont. Riverside Terrace Ltd., Island Park Dr., Ottawa, Ont.

▲ **Provincial Engineering Ltd.**, 674 Ferguson Ave., Niagara Falls, Ont., CA, $2,500,000, structural steel and mechanical installations for MILL EXPANSION, RED ROCK, ONT. Brompton Pulp & Paper Co. Ltd., Sun Life Bldg., Montreal, Que. E. & B. Cowan, 5400 Pare St., Montreal, Que., engrs. Margison, Babcock & Assocs., Ltd., 21 Richmond St. W., Toronto, Ont., engrs. Awarded Aug. 27. CD 11/5/51.

Monarch Construction & Realty Ltd., 606 Jarvis St., Toronto, Ont., Owner Builds, $850,000. Nine APARTMENT BLOCKS, incl. 99 suites, TORONTO, ONT. J. E. Hoare, 481 Eglinton Ave. W., Toronto, Ont., archt.

▲ **Principal Investments Ltd.**, 67 Richmond St. W., Toronto, Ont. Owner Builds. $3,000,000, L-shaped block 44 stores, 1,500 ft. frontage SHOPPING CENTER, on 11 acre site, Bathurst St. and Lawrence Ave. W., TORONTO, ONT.

▲ **Claydon Co., Ltd.**, 108 Syndicate Ave. N., Fort Williams, Ont., CA, $1,025,000, 5 story, 117 ft. long L-shaped, 161-bed HOSPITAL addn., SAULT STE. MARIE, ONT. Plummer Memorial Public HOSPITAL, A. G. Middlemiss, secy., Sault Ste. Marie, Ont. Bids Aug. 14, awarded Aug. 25. CD 7/17.

Cecil Carpenter & Co. Ltd., 5139 Decarie Blvd., Montreal, Que., CA, Approx. $500,000, 2 story, bsmnt., rein.-con. brick, block Roslyn Avenue SCHOOL, Roslyn and Estmount Aves., WESTMOUNT, QUE. Protestant School Comrs., Westmount, Que. A. L. Perry, 1434 St. Catherine St. W., Montreal, Que., archt.

AMERICANS ABROAD

BUILDINGS

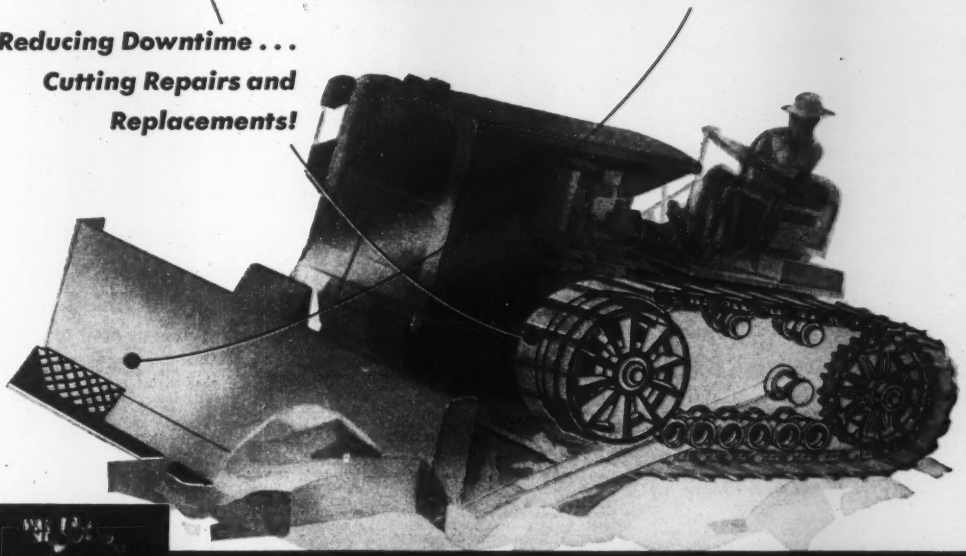
LOW BIDS AND CONTRACTS

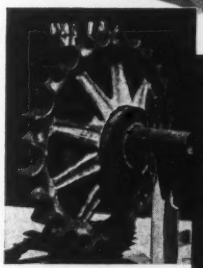
▲ **H. A. Brassert & Co.**, 60 E. 42 St., New York 17, N. Y., U. S. A., Est. $6,000,000. Blast FURNACE with 1 400 tons pig iron daily capacity, WESTERN GERMANY. West Falenhuette, A. G. Dortmund, Western Germany.

(Proposal Advertisements see pp. 64 to 67)

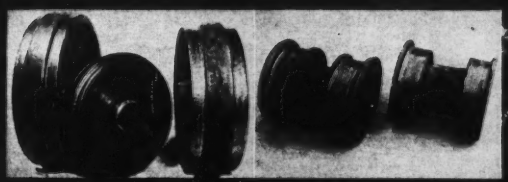
Where STOODY ALLOYS stretch out tractor life...

Reducing Downtime . . . Cutting Repairs and Replacements!



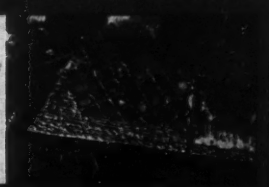


TRACTOR DRIVE SPROCKETS—rebuild and hard-face manually with Stoody Self-Hardening or Stoody 1027 to original size . . . rough grind high spots only . . . *gives service equal to new parts.*

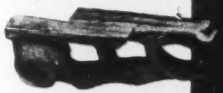


TRACTOR IDLERS

TRACTOR ROLLERS

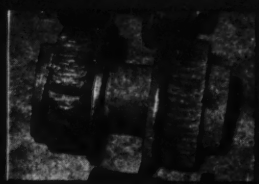


BULLDOZER END PLATES



TRACTOR RAIL LINK—hard-faced with Stoody 104, applied automatically. *Service life equal to new.*

BULLDOZER TRUNNIONS



TOP CARRIER ROLLS

BULLDOZER BLADES

For detailed procedure on manual rebuilding of tractor parts, ask your dealer for a free copy of STOODY GUIDEBOOK.

A list of custom automatic welding shops prepared to handle crawler maintenance work in your area is available from your Stoody dealer . . . see "Welding Equipment and Supplies" in the yellow pages of your phone book—or write direct to Stoody Company

STOODY COMPANY

11976 E. SLAUSON AVENUE, WHITTIER, CALIFORNIA

Bids—Low Bids—Contracts—Second Section

MIDDLE ATLANTIC

BIDS ASKED—BUILDINGS

N. Y., Bellerose—SCHOOL—B.A. 9/16—Co-ordinator of School Constr., 49 Flatbush Ave. exten., Brooklyn, Zone 1, general constr. plumbing and drainage, heating and ventilating, electrical work and lighting fixtures for new P.S. 191, south side of East Williston Ave. between 258 and 259 Sts., Queens Boro. Plans deposit $25. Extended date,

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

MARYLAND—State Rds. Comn., 108 E. Lexington St., Baltimore,

Bituminous Constr. Co., 3301 Ridgewood Ave., Baltimore, Md. LB $326,290. resurf. 3.605 mi. Eastern Ave. Baltimore city line to Marlyn Ave., Contr. B 655-415, Baltimore Co. Bid Aug. 26.

MARYLAND—State Rds. Comn., 108 E. Lexington St., Baltimore, Zone 2,

Bowers Constr. Co., Box 1706, Raleigh, N. C. LB $668,425. concrete substructure of bridge over Potomac River at Brunswick 2,425 ft. long, 20 spans, 2 abutments 14 piers, 5 bents rein.-con. piers 11 to 14 on steel H piles, Contr. F 507-3-715, Frederick Co. Bids Aug. 26. CD 8/11.

MARYLAND—State Rds. Comn., 108 E. Lexington St., Baltimore, Zone 2,

Jas. Julian, 405 S. Dupont St., Elsmere, Del. LB $735,826. grading, drainage, surf. 4.192 mi. National North-South Route via Chesapeake Bay Bridge, Contr. Q 168-14-215, Queen Annes Co. Bids Aug. 26. CD 8/5.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ † **Tandy & Allen Constr. Co., Inc.,** Hillsdale Ave. and Pascack Rd., Hillsdale, N. J., CA, $4,619,654, Signal Corps Engineering LABORATORY, FORT MONMOUTH, N. J. U. S. Eng., 80 Lafayette St., New York 13, Bids Aug. 4. CD 7/25.

Cook Anderson Co., 5 and Insurance Sts., Beaver, Pa., LB, $338,429, 2 story 36x105 ft., brick on tile GRADE SCHOOL, near Industry, FAIRVIEW, PA. Fairview Joint Auth., Industry, Pa. B. J. McCandless, 239 4 St., Ellwood City, Pa., archts.

James Keelty, 4200 Edmonson Ave., Baltimore, Md. Owner Builds. Est. $444,000. seventy-four 2 story, 18x32x27 ft., brick row type HOUSES, 1100 and 1200 blocks, Kiver Ave., BALTIMORE, MD. D. A. Neumayer, c/o owner. archt.

Home Sales Co., 2000 Whistler Ave., Baltimore, Md. Owner Builds. Est. $475,000. 68 16x30x25 ft., masonry row type HOUSES, 2800 and 2900 blocks, Edgecomb Circle South, BALTIMORE, MD. CD 5/12/50.

SOUTH

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

NORTH CAROLINA—State Hy. & P. Wks. Comn., Raleigh,

Sanford Constr. Co., Box 427, Sanford, N. C. LB $100,858, est. $75,000-$100,000. structures 3.18 mi. from point on US 64 approx. 1 500 ft. west of its Int. with NC 231 northeast to US 64 in Spring Hope, Proj. 1636 F 149 (2), Nash Co. CD 8/20, under Streets and Roads:

Kitchin Constr. Co., Box 3277, Fayetteville, N. C. LB $128,978, est. $125,000-$150,000. Maple Cypress Bridge over Neuse River on county road between Vanceboro and Fort Barnwell, Proj. 2-9-17-215, Craven Co., Bids Aug. 26, CD 8/21.

NORTH CAROLINA—State Hy. & P. Wks. Comn., Raleigh,

Dickerson, Inc., Box 448, Monroe, N. C. LB $367,086, est $300,000-$400,000, traffic bound macad., conc. binder surf. 7.91 mi. from end of 22 ft., C. conc. on US 17 approx. 4 mi. northeast of Williamston northeast to point in Windsor, Proj. 1068 F 165 (4), Bertie Co.; LB $117,804, est. $100,000-$125,000. sand asph. or b.-conc. base and surf. 6.54 mi. NC 130 from point near north city limits of Southport northwest to Int. with 20 ft. pavement of county road at Smiths, Proj. 3180 S 449 (1), Brunswick Co.;

C. G. Poole, Inc., Capital Club Bldg., Raleigh, N. C. LB $61,412, est. $75,000-$100,000. grading 3.18 mi. from point on US 64 approx. 1,500 ft. west of its Int. with NC 231, northeast to US 64 in Spring Hope, Proj. 1636 F 149 (2), Nash Co.;

J. S. Hill Constr. Co., Washington, N. C. LB $157,779, fine grading STBC and BST 6.305 mi. from end of pavement on Old US 64 approx. 8.7 mi. northeast of Columbia east to Fort Landing, Proj. 2-603 S 514 (2), Tyrrell Co.;

J. K. Cecil & Sons, Lexington, N. C. LB $131,202, est. $125,000-$150,000. traffic bound macad., BST 5.22 mi. from end of BST approx. 0.25 mi. south of Flint Hill southeast to point on US 64 approx. 6.5 mi. west of Asheboro, Proj. 6-410 S 599 (1), Randolph Co.;

H. F. Ramsey Co., Inc., Biltmore Station, Asheville, N. C. LB $116,152, est. $150,000-$175,000. traffic bound macad. and BST 2.2 mi. US 19-E from Tennessee State line southeast to Elk Park, Proj. 8041, Avery Co.;

Taylor Constr. Co., Inc., Johnson City, Tenn. LB $65,199, est. $75,000-$100,000. STBC, BST 4.67 mi. from end of 20 ft. BST pavement on county road approx. 0.8 mi. north of Iredell Co. line north to point on NC 90 in Hiddenite, Proj. 9-102 S 112 (1), Alexander Co.;

F. D. Cline Paving Co., Box 349, Raleigh, N. C. LB $91,043, est. $125,000-$150,000. b. conc. binder, surf. 17.3 mi. from Int. with US 70 near Clayton east to Wilson Co. line, Proj. RS 4-6-160, Johnston Co.;

Barrus Constr. Co., Box 561, Kinston, N. C. LB $112,484, est. $125,000-$150,000. b. conc. binder, surf. 10.05 mi. from Lenoir Co. line west to end of curb and gutter in Goldsboro, Proj. RS 4-6-39-130, Code 5900-417, Wayne Co.;

Blythe Bros. Co., Box 989, Charlotte 1, N. C. LB $85,208, est. $75,000-$100,000. s. a. and b. conc. surf. 22.7 mi. 1 sect. of county road in Montgomery Co. and 23 sections in Richmond Co., Proj. 7-9-62-224, 7-9-63-223, RS 7-6-63-145, Code 5900-742, Montgomery and Richmond Counties;

Propst Constr. Co., Inc., Concord, N. C. LB $121,047, est. $125,000-$150,000. STBC and BST 33.15 mi. surf. 20 sections of county roads, Proj. 7-9-64-237, Rowan Co.; LB $61,514, BST or s. a. or b.-conc. surf. 16.5 mi. from Selma to Old NC 10 from Short Journey School to NC 210 from Python Home Rd. southeast toward Little Creek from Cleveland School Rd. westerly to Road 149 from US 301 to NC 50 via Surles Cross Rd., Proj. 4-9-36-247, 4-9-36-251, Johnston Co. Bids Aug. 26. CD 8/20.

† **C. Y. Thomason Co.,** Greenwood, S. C. LB $125,348. sewage treatment plant at Charleston Air Base, Eng. 38-081-53-5, CHARLESTON, S. C. U. S. Eng. 33 Custom House, Charleston, S. C. Bids Aug. 26. CD 8/11.

† **Ellis-Thompson Co.,** P. O. Box 1132, Tampa, Fla., LB, $466,173, armament-electronics repair shop, warehouse, and railroad spur at MacDill Air Force Base, Inv. 53-3, TAMPA, FLA. U. S. Eng., P. O. Box 4970 Jacksonville, Fla. Bids July 31. CD 7/11.

† **Worthington Pump & Machinery Corp.,** 401 Worthington Ave., Harrison, N. J. LB $913,146. Sect. B, 7 pumps and motors for Beargrass Creek Pumping Station, CIVENG 15-029-53-13, KENTUCKY. U. S. Eng., 830 W. Broadway, Louisville 3, Ky. Previous bids rejected. New bids Aug. 26. CD 7/17, under CA.

† **Tennessee Valley Auth.,** New Sprankle Bldg., Knoxville, Tenn. Owner Builds. $500,000. electric sub-station, Clarksville, TENNESSEE. CD 6/10/49.

BUILDINGS

LOW BIDS AND CONTRACTS

N. Litterio & Co., Inc., c/o owner. CA Est. $640,000. eighty 2 story, bsmnt., brick, concrete, masonry semi-detached RESIDENCES, ALEXANDRIA, VA. Taylor Run Parkway, Inc., 3860 S. Four Mile Run, Arlington, Va. J. H. Saunders Jr., 121 S. Columbus St., Alexandria, Va., archt.

▲ **Luria Bros.,** 2300 Wilson Blvd., Arlington, Va. Owner Builds. $1,560,000. one hundred and thirty 1 story HOUSES built in sections, Pine Springs Housing Development, FAIRFAX, VA. Keyes, Smith & Satterlee, 3 DuPont Circle, Wash., D. C., archts.

▲ **M. T. Brayhill & Sons,** 4624 Lee Hy., Arlington, Va. Owner Builds. $3,500,000. three hundred and fifteen 1 and 2 story, some bsmnt., masonry HOUSES, built in sections, FALLS CHURCH, VA.

▲† **Wise Contg. Co.,** Eight and Grace Sts., Richmond, Va. LB $1,177,000. public works center transportation FACILITIES, NOY 70221, Spec. 30144, NORFOLK, VA. Fifth Naval Dist., U. S. Naval Base, Norfolk, Va. Bids Aug. 26. CD 8/4.

Whalley Constr. Co., 4115 Montgomery St., Savannah, Ga., CA, $330,137 Casimir Pulaski Elementary SCHOOL, SAVANNAH, GA. Chatham Co. Bd. Educ., Court House, Savannah, Ga. CD 1/2/51.

Immanuel Baptist Church, Ott and Henry Sts., Savannah, Ga., Owner Builds, $300,000, CHURCH, SAVANNAH, GA.

▲ **Paul Smith Constr. Co.,** 310 N. Rome Ave., Tampa, Fla., Owner Builds, $4,750,000, construct manage and finance 500 Wheery Act HOUSING units for personnel at Patrick Air Force Base, COCOA, FLA.

MIDDLE WEST

BIDS ASKED—BUILDINGS

▲ **Ill., North Chicago**—SCHOOL—B.A. 9/26—School District 64, 1110 18 St., 1 and 2 story, part bsmnt., rein.-con. fg, brick, stone Junior High School, $1,200,000. Fisher & Bryant, 79 W. Monroe St., Chicago, Zone 3, archts. CD 8/8.

Ill., Chicago—FACTORY—Bids Asked—Ceco Steel Products Corp., 4601 W. 26 St., Cicero, factory, at Broadview. $500,000. CD 8/5.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **The Ohio Fuel Gas Co.,** N. Front St., Columbus, O. Owner Builds. Est. $1,492,500. 33 mi. pipe line to replace 42 mi. of existing pipe line, replace 4.7 mi. pipe line to improv. existing distr. facilities, Crawford, Wyandot, Seneca, and Richland Counties, OHIO.

Norfolk & Western R.R., A. B. Stone, ch. engr., Roanoke, 17, Va., Owner Builds, $500,000, trackage to and from new gaseous diffusion atomic energy plant in Pike County from present N & W tracks paralleling the site, 60 mi. of tracks within the plate gates, PIKETON, O.

▲ **MICHIGAN**—State Hy. Dpt., 222 Townsend St., Lansing, Zone 13,

Darin & Armstrong, Inc., 2041 Fenkel St., Detroit, Mich. CA $1,515,159, est. $1,675,000. 3 concrete, steel vehicle bridge and pedestrian bridge Elizabeth St. UI B 3 of 82-22-12 CI (UI 404 42), Wayne Co. CD 8/26, under LB.

MICHIGAN—State Hy. Dpt., 222 Townsend St., Lansing, Zone 13,

Gould & Cross, 361 Weiss St., Saginaw, Mich. CA $557,438. grading, drainage structures 22 ft. concrete 5.147 mi. M-50, F 46-10 C9 (F 44 5), Lenawee Co. CD 8/18 under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Dawson Evans Constr. Co.,** 2407 Leonard Ave., Columbus, O. CA. $1,083,747. general and electrical contracts superstructure 2 story, brick, steel, concrete Mohawk SCHOOL, COLUMBUS, O. Bd. Educ., 270 E. State St., Columbus, O. Bids Aug. 22. CD 7/25.

Salem Village No. 2, 4532 Salem Ave., Dayton, O. Owner Builds. $385,000. 4 single RESIDENCES, Geis Rd.; 20 RESIDENCES, Martin Ave.; 1 RESIDENCE, Gatewood St.; 4 RESIDENCES, Corundu Ave.; 26 RESIDENCES, Runyon Rd., DAYTON, O.

Huber Development, 631 E. Stroop Rd., Dayton, O. Owner Builds. $660,000. 9 RESIDENCES and GARAGES, Pennlyn Ave.; 13 RESIDENCES and GARAGES, Shyer Rd., DAYTON, O.

Albert M. Higley, 2036 E. 22 St., Cleveland, O. CA. $650,000. 3 story, brick, steel, concrete men and women's DORMITORIES, GRANVILLE, O. Denison University, Granville, O. William Gehron, 101 Park Ave., New York, N. Y., archt. Awarded Aug. 26. CD 3/28/50.

R. S. Ursprung Co., Hanna Bldg. Annex, Cleveland 14, O. CA. $484,280. general contract elementary SCHOOL, Fry and Bagley Rds., MIDDLEBURG HEIGHTS, O. Bd. Educ., Berea, O. CD 1/24/51.

▲ **J. E. Williams Constr. Co.,** 6490 Page Ave., St. Louis, Mo., CA. $1,250,000, HOSPITAL, BENTON, ILL. Bd. Trustees, Franklin County Hospital, Benton, Ill. Bids Aug. 14, awarded Aug. 21. CD 8/26, under LB.

Freevol Smedberg Co., 5807 W. Chicago, Ill., CA. $400,000, 40,000 sq. ft. FACTORY, CHICAGO, ILL. Perfection Screw Products Co., 1105 S. Washtenaw St., Chicago, Ill. Awarded Aug. 21. CD 8/18.

† **Lee Constr. Co.,** 127 N. Dearborn St., Chicago, 2, Ill., LB. $507,232, liquid metals RESEARCH BLDG. at Argonne Laboratory, LEMONT, ILL. Atomic Energy Comn., Lemont, Ill. Bids Aug. 21. CD 8/13.

▲ **Joseph J. Duffy Co.,** 4994 N. Elston Ave., Chicago, 30, Ill., CA. $1,040,992, general contract new semi-infirm bldg. at Tinley Park. STATE HOSPITAL TINLEY PARK, ILL. State, Springfield, Ill. Bids July 15, awarded Aug. 26. CD 7/23, under LB.

▲ **Peter Kiewit Sons Co.,** 1024 Omaha National Bank Bldg., Omaha, Neb. CA. Est. $6,500,000. MINE DEVELOPMENT iron ore stripping Fortune Lake mine open pit constr. of loading ramps and 2 mi. railroad tracks, Fortune Lake and Lawrence Mines, CRYSTAL FALLS, MICH. Pickands, Mather & Co., Menominee Range, H. J. Richards, genl. supt., Crystal Falls, Mich.

WEST OF MISSISSIPPI

SOON LETS CONTRACT—BUILDINGS

Tex., Austin—HOSPITAL—Seton Hospital, 600 W. 26 St., soon lets contract, 5 story, 45x61 ft. hospital addn., 2 addnl. stories 44x96 ft., brick east wing to existing hospital, $750,000. Kuehn, Brooks & Barr, 202 Perry-Brooks Blvd., archts. CD 8/18.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Elliott Constr. Co., 503 Redick Tower, Omaha 2, Neb. CA $302,982. 3 transmission line crossings of Missouri River in Osage, Callaway, Jackson and Clay Counties, Missouri Proj. MO 71A Moniteau, MISSOURI. Central Electric Power Co-operative, 400 E. High St., Jefferson City, Mo. Bids Aug. 19. CD 8/13.

Peter Kiewit Sons Co., Omaha National Bank Bldg., Omaha, Nebr., LB, $174,285, paving and storm sewer;

H. J. Cathroe Constr. Co., 806 S. 37 St., Omaha, Neb., LB, $70,991, storm sewer only, OMAHA, NEB. City, City Hall, 18 and Farnam Sts., Omaha, Neb. Bids Aug. 19. CD 8/14.

S. Boyd Callan, Inc., Waco, Tex., LB, $202,525, Chambers Creek Water Reservoir, CORSICANA, TEX. City, City Hall, Corsicana, Tex. Forrest & Cotton, Praetorian Bldg., Dallas, Tex, engrs. CD 2/6.

BUILDINGS

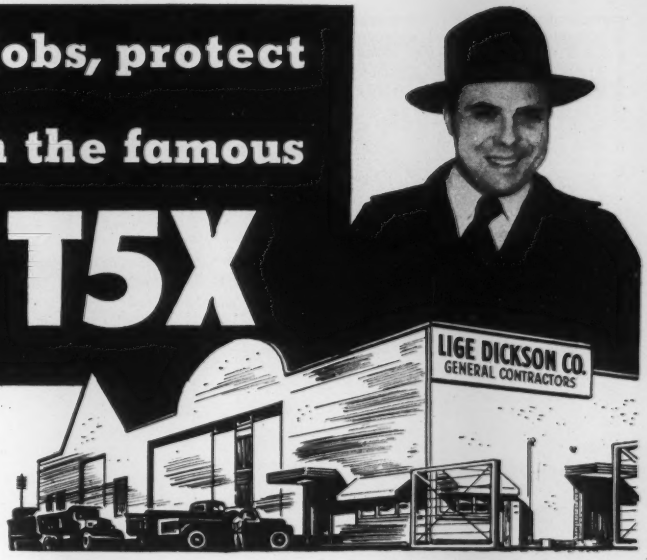
LOW BIDS AND CONTRACTS

Lewis C. Cadenhead Constr. Co., Daingerfield, Tex., CA. $325,000. HOUSING, DAINGERFIELD, TEX. Fleminster Park Homes, Inc., Daingerfield, Tex. CD 8/22.

▲ **O'Rourke Constr. Co.,** 1001 W. Commerce St., Dallas, Tex. CA. $1,637,000. 7 story, bsmnt., DEPARTMENT STORE unit, DALLAS, TEX. Tiche-Goettinger Co., Elm and St. Paul Sts., Dallas, Tex. Bids Aug. 15. CD 8/7.

(Continued on page 84)

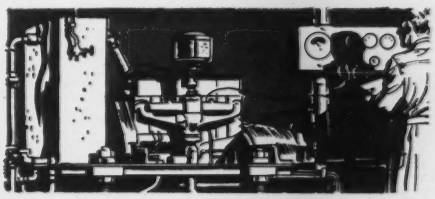
On rugged jobs, protect engines with the famous purple oil... T5X



Tacoma contractor reports Union Oil products are "of first quality consistently"

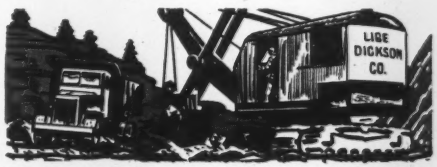
William B. Dickson of the Lige Dickson Company, Tacoma, Wash., writes: "We are general contractors engaged in heavy construction work of all types. Our fleet consists of many varied types of equipment and is powered by both gasoline and Diesel motors. For the past few years we have been purchasing Union Oil products and have found them to be of first quality consistently."

T5X—the amazing *purple* motor oil—is the lubricant found throughout the Lige Dickson Company's fleet. Mr. Dickson explains: "In our line of business, breakdowns must be avoided; consequently we continually try to improve our maintenance and adhere to equipment manufacturers' recommendations." T5X is the choice of many construction men because they know it passes rigid Army specifications for a heavy-duty oil.



In T5X, a combination of special compounds have been added to the finest of base stocks. These additives enable T5X to resist oxidation, corrosion and acid action. Sludge formation is kept at an absolute minimum. Because of its stability, T5X *does not* break down under long hours of continual heavy load.

Developed by the manufacturers of UNOBA—the industry's original multi-purpose grease



T5X is specifically designed to do an outstanding job under *any* operating condition, no matter how severe. If you want fewer breakdowns and lower maintenance costs, give T5X a trial in your engines operating under critical conditions.

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LOS ANGELES, Union Oil Building
NEW YORK, 4904 RCA Building
CHICAGO, 1612 Bankers Building
NEW ORLEANS, 917 National Bank of Commerce Building
CINCINNATI, 2111 Carew Tower Building

UNION OIL COMPANY OF CALIFORNIA

76

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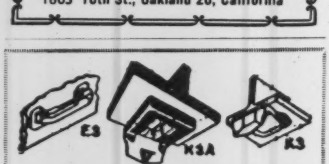

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Saxe Welding Connection Units position and secure structural parts to be welded.

Clip K3A permits an adjustable connection.

These widely used units eliminate all hole punching and, with welding, produce the most economical, safe and quickly erected structural frame.

Write for 1951 edition, Structural Welding Practice Manual.

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(Since 1915)

FOR • STEEL PLATE LINING • STEEL ENCASEMENT • BUILDING NEW WALLS • LINING WATER RESERVOIRS, TUNNELS AND SEWERS • PLATE LINING OF STEEL STACKS, BUNKERS, DUCTS • REPAIR OF DISINTEGRATED CONCRETE AND MASONRY • CANAL, DITCH AND DRAIN LINING

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District Branch Offices

Paul B. Watts, 228 N. LaSalle St., Chicago 1, Ill.
George R. Lewis Co., 2036 Queen Ave. S., Minneapolis 5, Minn.
B. H. Mueller Co., 6625 Delmar Blvd., St. Louis 5, Mo.
Ole K. Olsen Co., 823 Perdido St., New Orleans, La.
Philip D. Barnard, 2036 Addison, Houston 5, Tex.
Western Steel Prod. Co., 1755 W. 13th Ave., Denver 4, Colo.

(Continued from page 82)

Clairscrest Corp., 612 Colorado St., Austin, Tex., CA. $412,500, 55 units of defence HOUSING, VICTORIA, TEX. Federal Housing Admin., 610 S. Flores St., C. T. MacLeod, San Antonio, Tex. Bids Aug. 6. CD 7/24.

Airlawn Development Co., Inc., Pecos, Tex. Purchase & Hire, sub-contracts. $360,000. 48 DWELLINGS, PECOS, TEX. CD 8/5.

▲† C. H. Leavell Co., 1900 Wyoming St., El Paso, Tex., CA, $1,683,677, Schedule 7A, steel frame only;

D'Arcy, Leck, Dickinson & Maher Constr. Co., 1260 Quince St., Denver, Colo., CA. $443,474, Schedule 8, exterior work only, GSA WAREHOUSES and reservoir, Pueblo Ordnance Depot, No. 25-066-53-6, PUEBLO, COLO. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Aug. 8, awarded Aug. 22.

FAR WEST

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† Stolte, Inc. and Morrison-Knudsen Co., Inc., 8451 San Leandro St., Oakland, Calif., CA. $655,416. bachelor officers quarters, Inv. 1638, BEALE AIR FORCE BASE, CALIF. U. S. Eng., Wright Bldg., Sacramento, Calif. Bids June 27, awarded Aug. 21. CD 7/8, under LB.

† Peter Kiewit Sons' Co., 345 Kieways, Arcadia, Calif., CA. $889,000, strengthen taxiways and parking areas NOY 29922, Spec. 30872, MAJAVE, CALIF. Dpt. Navy, San Diego, Calif. Bids Aug. 7, awarded Aug. 21. CD 8/18, under LB.

▲ Dinwiddie Constr. Co., 210 Crocker Bldg., San Francisco, Calif., CA. $1,000,000, west addn. to Mausoleum of Mountain View Cemetery, PIEDMONT, CALIF. Mountain View Cemetery Corp., Piedmont Ave, Calif. Awarded Aug. 21.

▲ M & K Corp., 200 Financial Center Bldg., San Francisco, Fredrickson & Watson Constr. Co., 873 71 Ave., Oakland, and Piombo Constr. Co., 1571 Turk St., San Francisco, CA. $1,275,000, southeast collection sewers, Sec. E2, F1, 2 and 3, Hunter Point Sewer Tunnel, etc., SAN FRANCISCO, CALIF. Dpt. P. Wks., City Hall, San Francisco, Calif. Bids Aug. 13, awarded Aug. 20. CD 8/19, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

William Horstmeyer Co., 23 Mars St., San Francisco, Calif., CA. $465,347, 30,000 sq. ft. new Wherry Elementary SCHOOL, near HAMILTON FIELD, CALIF. San Jose Elementary School District of Marin Co., Hamilton, Calif. Bids Aug. 21, awarded 8/25. CD 8/1.

▲ The Bein Constr. Co., 139 S. Beverly Dr., Beverly Hills, R. J. Daum Constr. Co., 6803 West Blvd., Inglewood, M. J. Brock & Sons, Inc., 2849 Rowena St., Los Angeles, Calif., CA. $4,195,000, West Los Angeles HOUSING, LOS ANGELES, CALIF. Housing Auth. of City of Los Angeles, 1401 E. First St., Los Angeles, Calif. Bids Nov. 27, awarded Aug. 22. CD 12/4/51, under LB.

ALASKA

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲† ALASKA—Bureau P. Rds., Juneau,
Babler Bros. & Rogers, 4617 S. E. Milwaukee St., Portland, Ore. LB $1,323,340. grading, surf. 54.5 mi. Seward-Anchorage Hy., Proj. A5-B4. Bids Aug. 22. CD 8/13.

CANADA

BIDS ASKED—HEAVY CONSTRUCTION

Ont., Toronto—B.A. 9/30—City, A. A. Lamport, mayor, City Hall, 190 ft. main span, with cantilevers' Sherbourne St. Bridge over Rosedale Valley Rd., new abutment each end, flat arch in center, $980,000. Plans deposit $50. CD 10/4/49.

BIDS ASKED—BUILDINGS

▲ Ont., Toronto—HOSPITAL—B.A. 9/16—Northwestern General Hospital, c/o John B. Parkin & Assocs., archts., 717 Church St., 6 story, 45x188 ft. nursing section, 2 story, 124x140 ft. operating and administration section, 1½ story, 42x72 ft. boiler plant for hospital, $1,000,000. Plans deposit $25. Revised plans. CD 2/15.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ Union Gas Co., G. Weir, mgr., Chatham, Ont., Own Forces, $1,000,000, 10 in. gas mains from its fields in Dawn Twp. (Kent Co.) 40 mi. to Komoka (Middlesex Co.) to augment gas supply for London, ONTARIO.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ Bergerville Estates Ltd., 245 Des Capuchine St., Quebec City, Que. Own Forces, $2,000,000, OFFICE Des Forges St., THREE RIVERS, QUE. CD 8/27.

Proposed Projects—

WATER SUPPLY

▲ Kan., Olathe—City, c/o Mayor Irvin S. Dyke, municipally owned water sys. and treatment plant, Roeland Park, $1,500,000. CD 4/14/50.

▲ La., Bossier City—City, defeated $2,000,000 bonds, WW imprvs. CD 6/16.

▲ Md., Baltimore—City, Bureau Water Supply, 512 Municipal Bldg., bond election Nov. 4, Pikesville and Druid Reservoir circulators, $370,000; 48 in. transmission main, York Rd., $450,000; Belvedere Ave. mains, $250,000; tunnel connections Ashburton, $500,000; Montebello connections, $125,000; maintenance bldg. and yard, $600,000; general imprv. alterations, $710,000; 1 story Ashburton Filtration Plant, with pumping station, $12,500,000; misc. small projects, $1,995,000. Whitman, Requardt & Assoc., 1304 St. Paul St., engrs. CD 1/22/51.

Mo., Kansas City—Director P. Wks., City Hall, furnish, install 2 primary clarifiers, $750,000, Burns & McDonnell Eng. Co., 95 and Troost Sts., Kansas City, Mo., consult. engr. CD 4/27/51.

S. C., Barnwell—Town, WW sys. extension, $859,000.

SEWERS, WASTE DISPOSAL

S. C., Columbia—City, voted $775,000 bonds, storm sewers. CD 6/20.

▲ Ont., Scarborough—E. Ridout Real Estate, Ltd., 22 St. Thomas St., Toronto, sewage disposal plant in Highland Creek Valley and sewage pipe line to Danforth (5 mi.). $1,000,000. E. G. Faludi, 24 E. Bloor St., Toronto, consult. engr.

▲ Ont., Toronto—Scarborough Twp., 2001 Eglinton Ave. E., sewage disposal plant in Highland Creek Valley to service the 2nd Satellite Community also 5 mi. sewage pipe line to Danforth and Lawrence Aves. $1,000,000.

BRIDGES

▲ Illinois and Missouri—City of Granite City, Ill., c/o Mayor, City Hall, vehicular bridge across Mississippi River between Granite City, Ill. and St. Louis, Mo. $3,000,000.

▲ Md., Baltimore—City, Bureau Hys., 303 Municipal Bldg., Monroe Street Bridge over B & O tracks south of Washington Blvd., rein.-con. steel span, 200 ft. long, roadway, sidewalks $2,000,000, W. W. Pagon, Baltimore Life Bldg., consult. engr.; Colgate Creek Bridge imprvs. to strengthen existing bridge, $150,000, Turpin, Wachter & Assoc., 1004 N. Charles St., engrs., Jas. H. McKay, city engr.

▲ Tex., Houston—City, City Hall, 900 Brazos St., voted bonds, general bridge constr. $350,000; bridge across Buffalo Dr., $650,000; bridge and grade separation, $350,000. W. E. White, city engr. CD 8/7.

STREETS AND ROADS

▲ Mich., Detroit—City—Wayne County, Huron-Clinton Metropolitan Auth., Charles G. Oakman, chn. Comm., Riverfront Drive from Waterworks Park to Alter St. using Tennessee, Avondale, Frued Sts., etc., bridges at Lakewood Canal, Alter St. and Railroad tracks over Fox Creek, $2,000,000, George R. Thompson, city engr. Leroy Smith, co. engr. CD 3/30/43.

▲ Neb., Omaha—City, City Hall, 18 and Farnam Sts., Douglas Co., Court House, and Bureau P. Rds., Federal Office Bldg., Kansas City, Mo., arterial hy. from downtown Omaha to municipal airport, $1,000,000. E. W. Woodbridge, city engr., William Green, co. engr.

▲ SOUTH CAROLINA—State Hy. Dpt., Columbia,
Anderson Co.—four-lane hy. along Murray Ave. from Bleckley to Saynne in city of Anderson, $1,500,000.

S. C., Columbia—City, voted $740,000 bonds, street paving. CD 6/20.

▲ Tex., Houston—City, City Hall, 900 Brazos St., voted bonds, opening, wid'n. and imprv. certain streets, $3,500,000; bit. surf. and resurf. streets, incl. concrete curbs, gutters and culverts, $700,000; street blacktopping program, $700,000; permanent type street paving, curbs and gutters, $1,150,000; flexible street pavement constructed of shell, gravel or other similar materials and appurtenances, $500,000. W. E. White, city engr. CD 8/7.

Ont., Malton—York Co., 67 Adelaid St. E., Toronto 5 mi. paved hy. from Malton to Islington Ave. Etobicoke for defense workers in aircraft plant in suburban Toronto, $650,000.

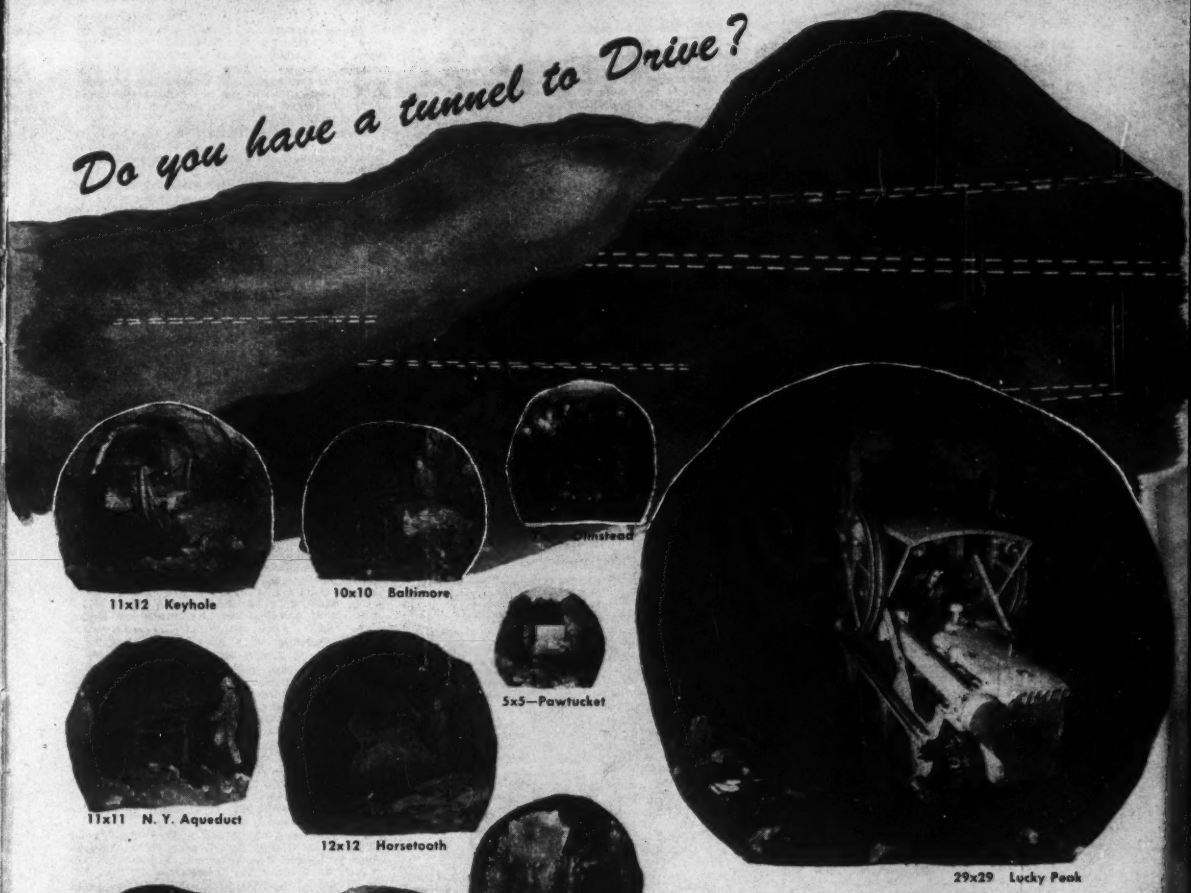
EARTHWORK, WATERWAYS

▲† Virginia—U. S. Eng., foot of Front St., Norfolk, completing John H. Kerr Reservoir (Buggs Island Dam) on Roanoke River, incl. power house and installing 6 generating units. $6,840,000. CD 8/3/44.

▲† Virginia—U. S. Eng., foot of Front St., Norfolk, Gathright-Falling Spring Reservoir, incl. 2 dams on Jackson River, James River Basin. $20,000,000 ($100,000 allotted for planning).

(Continued on page 86)

Do you have a tunnel to Drive?



11x12 Keyhole

10x10 Baltimore

Olmstead

5x5—Pawtucket

29x29 Lucky Peak

11x11 N. Y. Aqueduct

12x12 Horsetooth

9x9 Treasury

12x12 Alva B. Adams

9x9 N. Poudre

12x12 Scottish Hydro

20x20 St. Mary's

9x9 Rainbow

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IN ENGLAND, EIMCO (GREAT BRITAIN) LTD., LEEDS 12, ENGLAND
IN ITALY, EIMCO ITALIA S.P.A., MILAN, ITALY

(Continued from page 84)

AIRPORTS

▲ **Ill., Chicago**—HANGAR, etc.—Braniff Airways, Love Field, Dallas, Tex., plans by Albert F. Heino & Assoc., 7919 S. Ashland Ave., hangar and maintenance shop on Midway (Municipal) Airport, $1,200,000.

▲ **Kan., Wichita**—TERMINAL BLDG.—Bd. Park Comrs., City Hall, terminal bldg., Wichita Municipal Airport. $1,570,000. CD 10/4/51.

† **Mass., Weymouth**—BARRACKS—First Naval Dist., 495 Summer St., Boston, plans by W. Chester Browne & Assoc., 184 Boylston St., Boston, barracks, 5 buildings, Naval Air Station, South Weymouth. $500,000. CD 12/28/50.

▲ † **Mass., Weymouth**—HANGAR—First Naval Dist., 495 Summer St., Boston, plans by Chester Browne & Assoc., 184 Boylston St., Boston, Hangar 1 Naval Air Station. $1,000,000; rehabilitate Boiler Room Bldg. $200,000, South Weymouth. CD 12/28/50.

▲ **Neb., Omaha**—AIRPORT IMPRVS.—City, City Hall, 18 and Farnam Sts., airport imprvs., incl. terminal bldg., imprv. old terminal, plane ramps, taxi strips and parking areas. $3,370,000. E. W. Woodbridge, city engr. CD 9/25/50.

▲ **Tex., Houston**—AIRPORT—City, City Hall, 900 Brazos St., defeated bonds Aug. 23, providing one or more addnl. municipal airports. $3,000,000. CD 8/7.

Tex., Lackland Air Base—MILITARY BLDGS.—U. S. Eng., 606 Santa Fe Bldg., Galveston, remodeling and repairing personnel housing on military reservation, $750,000; vehicle maintenance shop, $150,000; remodeling and repairing to AFB bldgs. (other than personnel housing), $1,250,000; security fencing, $60,000; railway spurs, addnl. in warehousing area, $75,000; 2 base exchanges, 2 theatres, $350,000; incinerator, $60,000.

LATIN AMERICA

▲ **Mexico, Tenixtepec**—Poza Rica-Petroleos Mexicanos, Juarez, 104, Mexico City, plans 50 mi. oil pipe line, $2,000,000.

Mexico, Tlalcozotitlan—Federal Electricity Comn., Humboldt, 45, Mexico City, plans hydro-electric plant, $500,000.

PUBLIC BUILDINGS

▲ **D. C., Wash.**—APARTMENT—National Capitol Housing Admin., 1728 L St. N.W., plans by L. Justement, 2011 K St. N.W.,-Wash., 500 unit 2 story, apartment bldg., D.C. 1-19, Lily Ponds Dwelling N.E. $4,500,000.

▲ **Ga., Albany**—HIGH SCHOOL—Dougherty Co. Bd. Educ., Albany, plans by Dennis & Dennis, Bankers Insurance Bldg., Macon, high school, $2,000,000.

Ga., Athens—HIGH SCHOOL—City, Athens, plans by Wm. J. J. Chase & Assoc., Candler Bldg., Atlanta, White High School. $521,000.

Ga., Atlanta—SCHOOL, etc.—City, plans by Francis M. Daves & Assoc., 57 8 St. N. E., Sylvan Hills High School addn., $540,000; plans by Tucker & Howell, Rhodes-Haverty Bldg., South Atlanta High School, $835,000.

▲ **Ga., Blakeley**—SCHOOLS—Early Co. Bd. Educ., Blakeley, plans by Rayburn S. Webb, Albany, Washington High School, $821,000; Kestler Colored School, $326,000.

Ga., Cleveland—SCHOOL—White Co. Bd. Educ., Cleveland, plans by Hal W. Greer, Buckhead Theater Bldg., Atlanta, high-elementary school, $750,000.

Ga., Douglas—SCHOOL—Coffee Co. Bd. Educ., Douglas, plans by Lloyd Greer, Box 525, Valdosta, Carver Elementary School addn., $312,000; White High School, $641,000.

Ga., Leesburg—SCHOOL—Lee Co. Bd. Educ., Leesburg plans by H. H. Beckanstin, 1241 W. Peachtree St. Atlanta, county training school, $600,000.

Ga., Pelham—SCHOOLS—City, plans by Hudson & Jenkins, Healey Bldg., Atlanta, elementary school. $400,000; training school, $500,000.

Ga., Roswell—HIGH SCHOOL—Fulton Co. Bd. Educ., Court House, Atlanta, plans by Stevens & Wilkinson, 157 Luckie St. N.W., Atlanta, high school. $500,000.

Ga., Sylvania—SCHOOL—Screven Co. Bd. Educ., Sylvania, plans by Aeck & Assocs., 140 Peachtree St., Atlanta, county training school, $504,000.

Ind., Kendallville—SCHOOL—Bd. School Trustees, Kendallville, 2 story, bsmnt., brick, 14-room School, $500,000.

▲ **Md., Baltimore**—HOSPITAL—State, Dpt. P. Imprvts., 506 Park Ave., plans by Hal A. Miller & Assoc., 2118 Maryland Ave., masonry Montebello Chronic Disease Hospital, Herring Run and Harford Rd. $1,750,000. Nathan L. Smith, ch. engr.

▲ **Md., College Park**—PHYSICAL EDUCATION AND ACTIVITY BLDG.—University of Maryland, College Park, plans by Hall, Border & Donaldson, 2111 N. Charles St. Baltimore, physical education and activity bldg. $3,000,000. H. Walton Redmile & Assoc., 1926 Eye St. N.W., Wash., D. C., consult. engrs. CD 1/9/48.

▲ **Mass., Gloucester**—HOUSING—Gloucester Housing Auth., 128 Main St., plans by Kelley & Gruzen, 3 Tremont St., Boston, PHA Mass 17-2 housing. $2,000,000. CD 1/30/52.

▲† **Mass., South Boston**—BARRACKS, etc.—Officer in Charge of Constr., 495 Summer St., Boston, plans by Coletti Bros., 687 Boylston St., Boston, 5 story, barracks bldg., mess hall, A and B Sts. $2,000,000.

Mich., Adrian—SCHOOLS—Bd. Educ., Adrian, plans by Louis C. Kingscott & Assoc., Inc., 511 Monroe St., Kalamazoo, 2 brick, steel elementary schools, Winter and State Sts., southern sect., $320,000; brick, steel elementary school, Northwest Heights, W. Maple Ave., $320,000; 2 story, bsmnt., brick, steel McKinley Elementary School addn., $300,000. CD 4/15.

Mich., Birmingham—SCHOOL—City, Bd. Educ., 2 story, bsmnt., brick, steel elementary school Beverly Hills section, $800,000.

Mich., Detroit—SCHOOL—City, Bd. Educ., 1354 Broadway, plans by Leinweber, Yamasaki & Hellmuth, 112 Madison St., 2 Story, bsmnt., brick, steel Abner Larned Elementary School, Appleton and Clarita Sts. $500,000.

Mich., Greenville—SCHOOL—City, Bd. Educ., $700,000 bond election Sept. 22, brick, steel, concrete high school.

▲ **Mich., Saulte Ste Marie**—MEMORIAL—City, Carl Sedan, secy, Memorial Comn., plans by William E. Kapp, 1842 Buhl Bldg., Detroit, brick, steel, stone memorial bldg., incl. library, marine museum, aquarium and marine weather Station, $3,000,000.

▲ **Mo., Joplin**—SCHOOL—Bd. Educ., voted $1,500,000 bonds May 20, school expansion, E. L. Peterson, 1103 E. Armour St., Kansas City, Mo., archt. CD 5/27.

Mont., Missoula—FIELD HOUSE—Montana State University, Missoula, field house, incl. auditorium, arena, $750,000.

▲ † **N. J., Raritan**—WAREHOUSE—U.S. Eng., 80 Lafayette St., New York, 13, N. Y., plans by Frank Grad, 48 Commerce St., Newark, Warehouse 2, $1,000,000—$3,000,000.

▲ **N. C., High Point**—LIBRARY—City, City Hall, bond election Nov. 4, library-civic center. $2,000,000.

▲ **N. C., Wilmington**—GRAIN ELEVATOR—North Carolina State Ports Auth., 225 Princess St., grain elevator. $1,000,000.

N. D., Williston—COURT HOUSE—Williams Co., Williston, plans by W. F. Kurke & Assocs., 117 13 Ave. N., Fargo, court house, $600,000. CD 2/9/50.

▲ **O., Cleveland**—ADMINISTRATION — Cuyahoga Co., Court House, bond election Nov. 4, 8 story, 147,000 sq. ft. county administration bldg., Ontario St. and Lakeside Ave. $4,400,000. CD 2/9/50.

O., Maple Heights—SCHOOL—Bd. Educ., Maple Heights, voted bonds, school imprvs., and Dunham Road School addn. $650,000. CD 7/1.

▲ **R. I., Warwick**—SCHOOL—City Supt. of Schools plans by MacConnell & Walker, 3308 Post Rd., brick, concrete, steel high school, Oakland Beach Section, $2,500,000. CD 11/12/51.

Tex., Houston—FIRE STATION, etc.—City, City Hall, 900 Brazos St., voted bonds, central fire station and electric fire alarm sys. imprvs., extens. $500,000. W. E. White, city engr. CD 5/19/49.

Tex., Houston—HEALTH CENTER—City, City Hall, 900 Brazos St., voted bonds, public health center. $500,000. W. E. White, city engr. CD 6/3/51.

▲ **Tex., Houston**—HOSPITAL—City, City Hall, 900 Brazos St., voted bonds, City-County Hospital. $4,500,000. CD 2/3/50.

▲ † **Tex., Karnack**—ORDNANCE PLANT—U. S. Eng., 100 W. Vickery St., Fort Worth, ordnance plant project, at Longhorn Ordnance Works, $30,000,000. Thiokol, 780 N. Clinton Ave., Trenton, N. J., and R. W. Booker & Assoc., 1722 Olive St., St. Louis, Mo., engrs.-archts.

Tex., Kenedy—HOUSING—Housing Auth. of City of Kenedy, plans by Weidner & Walther, 610 Alamo National Bldg., San Antonio, 100 housing units, $750,000. Helland & Seligmann, 302 Frost Bldg., San Antonio, Tex., consult. engrs. CD 8/22.

Tex., San Antonio—PUBLIC WORKS HEADQUARTERS—City, City Hall, Military Plaza, public works headquarters. $710,490. J. L. Dickson, Ch. P. Wks. Engr.

▲ **Va., Portsmouth**—HOUSING—Portsmouth Redevelopment & Housing Auth., 1900 Columbus Ave., plans by Williams, Colle & Blanchard, 3515 Virginia Ave., Newport News, 845 Public Housing Units. $8,450,000. Butler Ballance, c/o owner, exec. dir.

▲ **Wash., Everett**—JUNIOR COLLEGE—School Bd., Everett, plans by H. W. Hall, Commerce Bldg., Junior College bldgs. $2,000,000. CD 3/7/45.

Puerto Rico, Utuado—HOSPITAL—Dpt. Interior, San Juan, hospital and health center, $667,472.

▲ **Ont., Millbrook**—JAIL—Dpt. P. Wks., Parliament Bldgs., Toronto, plans by G. N. Williams, deputy minister and ch. archt., c/o owner, jail for 250 inmates, near here, $1,500,000.

COMMERCIAL BUILDINGS

Calif., Ventura—SHOPPING CENTER—Poinsettia Properties, c/o Harold S. Johnson, 606 S. Hill St., Los Angeles, 120,000 sq. ft. shopping center, incl. 21 stores, $500,000.

Fla., Miami Beach—HOTEL—Indian Creek Drive Hotel, c/o Donald J. Reiff, archt., 835 Lincoln Rd. Miami Beach, hotel, $500,000.

▲ **Ga., Atlanta**—HOTEL, etc.—The Massell Companies, 40 Pryor St. S. W., hotel, $2,500,000; office bldg., $2,100,000.

Ga., Savannah—STORE— Lvey's Inc., Abercorn and Broughton Sts., department store addn. $530,000.

Ill., Chicago—OFFICE—A. C. Nielsen Co., 2101 W. Howard St., Zone 26, plans by Lewis B. Walton, 626 Grove St., Evanston, office addn. $500,000.

Ill., Chicago Heights—SCHOOL—Catholic Archdiocese of Chicago, 719 N. Wabash St., Chicago, Zone 11, plans by R. L. Ignelzi, 29 W. 16 St., Catholic high school $750,000. Perkins & Will, 309 Jackson Blvd., Chicago, Zone 6, assoc. archts. CD 9/5/51.

Ill., Wheaton—SHOPPING CENTER—Don Devito & Frank Corto, 927 E. Roosevelt St., plans by Robt. H. Salisbury & Assocs., 213 W. Wesley Ave., shopping center, $500,000.

▲ **Kan., Fort Scott**—HOSPITAL—Sisters of Mercy, Fort Scott, plans by Schmidt-McVay & Peddle, 1832 E. 2 St., Wichita, hospital, $2,000,000. CD 4/3/46.

▲ **Mich., Detroit**—HOSPITAL—Detroit Medical Hospital, John F. Ivory, pres., 7850 E. Jefferson St., 11 story, brick, steel, concrete hospital, Jefferson and Seminole Sts. $5,000,000.

▲ **Mich., Oak Park**—HOUSING—Edward Rose, 14900 Linwood St., Detroit, 300 single brick, frame homes, on 60 acre site, Greenfield Rd. and Oak Park Blvd. $3,200,000.

▲ **O., Dayton**—DORMITORY—University of Dayton, 300 College Park St., plans by Freeman A. Pretzinger, Reibold Bldg., four story, 43x204 ft. 216-room men's dormitory with two 30x80 ft. wings, U-shaped, rein.-con., on eastern portion of campus. $1,320,000. CD 10/24/49.

▲ **Pa., Pittsburgh**—HOUSING—Belmar Gardens, Inc., 306 Triangle Bldg., plans by Irwin Gerber & A. Pancini, 11 Commerce St., Newark, N. J., Belmar Gardens, 18 buildings, 2 story, bsmnt., 30x104 ft., 30x144 ft., 124 housing units, $1,500,000.

▲ **Pa., Pittsburgh**—STORE—Kaufman's Department Store, 5 and Smithfield Sts., plans by Hoffman & Crumpton, Century Bldg., 12 story, bsmnt. department store. $4,850,000. CD 10/25/51.

▲ **Tenn., Oak Ridge**—RESIDENCES—Management Services, Inc., Oak Ridge, 500 residences. Approx. $2,000,000.

▲ **Tex., Kingsville** — HOUSING — Dpt. Navy, Officer in Charge of Construction, 8th Naval Dist., Bldg. 16, Naval Air Station, New Orleans, La., construct, manage and finance, 233 enlisted men's housing units, $1,747,500; 64 officers housing units, $512,000. Milam & Roper, 368 Casa Linda Plaza, Dallas, Tex., consult. engrs. and archts. CD 8/22.

Tex., Nacogdoches—HOTEL—Hotel Committee, c/o Jack McKinney, Nacogdoches, hotel, $800,000.

▲ **Tex., San Antonio**—DWELLINGS—Roy Pletz, 1426 N. Brazos St. 50 frame dwellings, $375,000; 60 frame, cedar shake dwellings, concrete slab fdns., $425,000; 75 frame, masonry trim dwellings, $450,000; 90 masonry trim dwellings, concrete slab fdn., $745,000, in a 500-home site tract in a area of Loma Park.

▲ **Va., Norfolk**—RESIDENCES—Constructioneers, Inc., 1430 W. Sewells Point Rd., 40 masonry residences, $1,200,000, A. E. Searies, c/o owner, engr.

▲ **Ont., Scarborough**—HOUSING—H. F. Fishleigh, 372 Bay St., Toronto, housing development, north of Eglinton Ave. $3,500,000. E. G. Faludi, 24 E. Bloor St., Toronto, consult. engr.

▲ **Ont., Scarborough**—HOUSING—E. Ridout Real Estate, Ltd., 22 St. Thomas St., Toronto, housing development in Highland Creek Valley area. $3,000,000. E. G. Faludi, 24 E. Bloor St., Toronto, consult. engr.

▲ **Ont., Toronto**—APARTMENT—Don Mills Development Ltd., Taylor, McDonald & Co., 15 King St. W. 200 apartment suites and about 300 houses at "Satellette" Community Development, Lawrence Ave. E. at Don Mills Rd. Approx. $1,500,000.

INDUSTRIAL BUILDINGS

▲ **Ill., Chicago**—PLANT—G. H. Hammond Co., 4551 S. Racine Ave., meat packing plant, $1,000,000.

Ill., Chicago—WAREHOUSE—Produce Terminal Cold Storage Co., 1550 S. Blue Island Ave., cold storage warehouse, $780,000. Henschein Everds & Crombie, 59 E. Van Bureen St., Zone 4, consult. engrs.

▲ **Ill., Lombard**—LABORATORY—American Can Co., 104 S. Michigan Ave., Chicago, Ill., laboratory for research $1,000,000.

▲ **Ind., Greencastle**—PLANT—International Business Machine Corp., 420 E. Jefferson St., Detroit, Mich. plans by Giffels & Vallet, 1000 Marquette Bldg., Detroit, Mich., 1 story, brick, steel mfg. card plant, $3,500,000. CD 5/13.

Me., Rumford—BLEACHERY—Oxford Paper Co., Rumford, 5 story, masonry, concrete bleachery, $500,000, Engineering Services, Inc., 844 Stevens Ave., Portland, consult. engr.

Mich., Saginaw — MANUFACTURING UNIT — Saginaw Steering Gear Div. General Motors Corp., 628 N. Hamilton St., plans by Argonaut Realty Div. General Motors Corp., General Motors Bldg., Detroit 1, story, 100x750 ft., brick, steel, concrete hydraulic steering gear mfg. unit, $800,000.

▲ **O., Toledo**—FACTORY—Howard Crosby, 717 Madison Ave. 100,000 to 150,000 sq. ft. factory to be known as "Industries Bldg." on 8-acre site, Manhattan and Wausonoquette Blvds. $1,000,000.

▲ **Tex., Houston**—PLANT—Diamond Alkali Co., 1006 Main St., chlorine plant, $8,750,000. CD 11/18/48.

Tex., Judkins—PLANT—Phillips Petroleum Co., Judkins, natural gasoline production plant imprvs. $650,000.

Tex., Levelland—REFINERY—Honolulu Oil Corp., Levelland, refinery imprvs. and expansion, near here. $537,216.

Tex., McLean—REFINERY—Warren Petroleum Corp., McLean, refinery addns. $560,000.

▲ Alaska—ALUMINUM PLANT—Aluminum Co. of America, 2156 Gulf Bldg., Pittsburgh 19, Pa., plans aluminum plant, including smelting plant, 2 power plants, 13 mi. power tunnel, transportation facilities, and community development, with housing, schools, churches, store near Skagway, Taiya Valley District. $400,000,000.

UNCLASSIFIED

▲ Colorado—RURAL DISTRIBUTION LINE—Morgan County Rural Electric Assoc., Ft. Morgan, 489 mi. rural distr. line and sys. imprvs., Morgan Co. $1,295,000. CD 6/19/50.

▲ Fla., Tallahassee—GAS DISTRIBUTION SYSTEM—City, natural gas distr. system, $2,940,000.

O., Cleveland Heights—SWIMMING POOL—City, 2953 Mayfield Rd., bond election Nov. 4, swimming pool. $500,000.

Ore., Portland—TELEVISION STATION—Portland Television, Inc., U. S. National Bank Bldg., television station, $538,750. George C. Davis, Munsey Bldg., Wash., D. C., consult. engr.

Pa., Harrisburg—TELEVISION STATION—Harrisburg Broadcasters, Inc., 11 N. Second St., television station, $767,260. Craven, Lohnes & Culver, Munsey Bldg., Wash., D. C., consult. engrs.

Pa., Phila.—TELEVISION STATION—Daily News Television Co., 1425 Walnut St., television station, $640,800. Craven, Lohnes & Culver, Munsey Bldg., Wash., D. C., consult. engrs.

Pa., Phila.—TELEVISION STATION—Pennsylvania Broadcasting Co., 35 S. Ninth St., television station, $600,000. E. C. Page, Bond Bldg., Wash., D. C., consult. engr.

▲ Pa., Pittsburgh—TELEVISION STATION—Pittsburgh Radio Supply House, Inc., 1406 Chamber of Commerce Bldg., television station, $1,170,000. M. W. Garrison, 1519 Connecticut Ave. N.W., Wash., D. C., consult. engr. CD 9/15/44.

S. C., Columbia—TELEVISION STATION—Broadcasting Co. of The South, 1111 Bull St., television station, $597,700. Craven, Lohnes & Culver, Munsey Bldg., Wash., D. C., consult. engrs.

S. C., Greenville—TELEVISION STATION—Greenville News-Piedmont Co., News Bldg., television station, $696,180, A. D. Ring & Co., Munsey Bldg., Wash., D. C., consult engrs. CD 10/19/44.

Tenn., Knoxville—TELEVISION STATION—Tennessee Television, Inc., Box 1390, television station, $559,720, A. D. Ring & Co., Munsey Bldg., Wash., D. C., consult engrs.

Tenn., Memphis—CEMETERY—Memorial Garden Cemetery, Macon and Munson Rds., cemetery development, $500,000.

Tenn., Memphis—TELEVISION STATION—WMPS Inc., 112 Union Ave., television station, $716,000, Craven, Lohnes & Culver, Munsey Bldg., Wash., D. C., consult. engrs. CD 10/13/48.

Tenn., Memphis—TELEVISION STATION—WREC Broadcasting Service, Hotel Peabody Bldg., television station, $500,200, A. D. Ring & Co., Munsey Bldg., Wash., D. C., consult. engrs.

Tenn., Nashville—TELEVISION STATION—WSIX Broadcasting Station, Nashville Trust Bldg., television station, $595,870, A. D. Ring & Co., Munsey Bldg., Wash., D. C., consult. engrs.

▲ Texas—RURAL DISTRIBUTION LINES—Bailey County Electric Co-operative Assoc., Muleshoe, 100 mi. rural distr. line, 38 mi. 60 kv transmission line and sys. imprvs., Bailey Co. $1,050,000. CD 3/31.

▲ Texas—PIPE LINES—Phillips Pipe Line Co., Bartlesville, Okla., crude pipe lines, Odessa and Olton areas, $1,061,400.

Texas—RURAL DISTRIBUTION LINES—Sam Houston Electric Co-operative, Livingston, 240 mi. rural distr. line and sys. imprvs., Polk Co. $775,000. CD 7/13/50.

Tex., Beaumont—TELEVISION STATION—Lufkin Amusement Co., Keltys St., television station, $557,200, William L. Foss, Inc., 927 15 St. N. W., Wash., D. C., consult. engr.

Tex., Houston—PARKS, etc.—City, City Hall, 900 Brazos St., voted bonds, parks, recreation, playgrounds. $500,000. W. E. White, city engr. CD 8/19.

Tex., Houston—TRAFFIC SIGNAL SYSTEM—City, City Hall, 900 Brazos St., voted bonds, electric traffic signal sys. extens., imprvs. $500,000. W. E. White, city engr. CD 8/7.

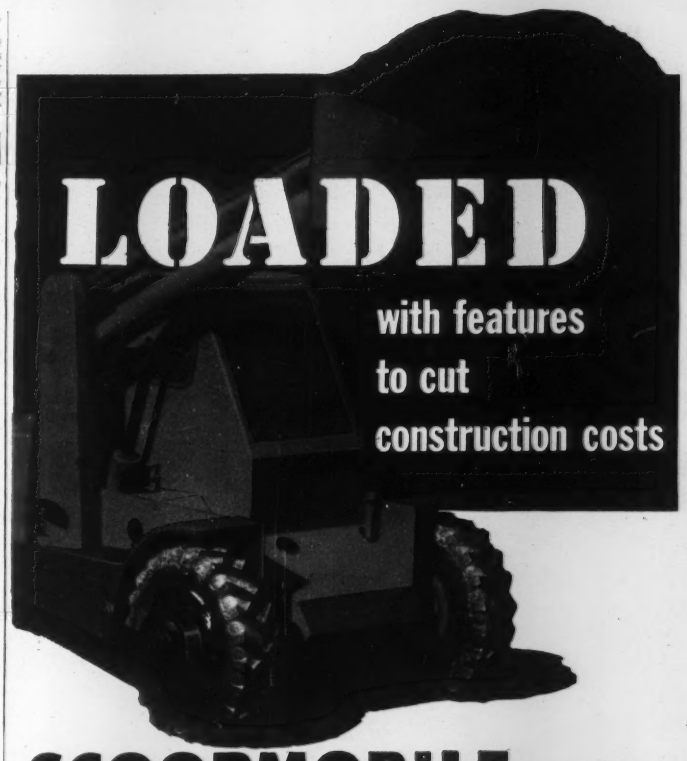
Tex., Houston—TELEVISION STATION—Houston Area Television Co., Esperson Bldg., television station, $829,400, Kear & Kennedy, 1302 18 St. N. W., Wash., D. C., consult. engrs.

▲ Tex., Houston—TELEVISION STATION—KTRH Broadcasting Co., Main and Texas Ave., television station, $1,221,000, George C. Davis, Munsey Bldg., Wash., D. C., consult. engr. CD 1/16/52.

Tex., Houston—TELEVISION STATION—Shamrock Broadcasting Co., Gulf Bldg., television station, $560,150, Craven, Lohnes & Culver, Munsey Bldg., Wash., D. C., consult. engrs.

Tex., Houston—TELEVISION STATION—University of Houston, 3801 Cullen Blvd., television station, $600,000.

▲ Alaska, Anchorage—WATER TERMINAL FACILITIES—Anchorage Port Auth., Anchorage, deep water terminal facilities. $8,000,000.



SCOOPMOBILE model H

FULL HYDRAULIC FRONT-END LOADER

Handle more loads per hour . . . and a heaping bucketful every time . . . with the all-hydraulic SCOOPMOBILE engineered to cut costs and accidents on every construction job.

Bucket on powerful hydraulic arm scoops a smooth arc and automatically levels for fast cycle lift to dumping position. Tricycle chassis and power steering give maximum maneuverability. Operator in clear-vision safety cab directs every operation with finger-tip controls.

Years-ahead design and rugged construction give long life and heavy-duty service.

It dozes . . . scoops . . . transports . . . backfills . . . loads all types of bulk materials.

- **Standard ¾ cu. yd. bucket scoops chassis-width track.**
- **Rated lifting capacity, 4,000 lbs.; standard discharge height to 8 ft.**
- **Heavy duty industrial engine and planetary drive axle with 3 to 1 reduction ratio gives ample reserve power.**
- **Can be driven at speeds to 20 m.p.h. and towed from one job to the next.**
- **Quick-change attachments include: Swivel type concrete hopper. Lift forks.**

EXTRA-LOW IN INITIAL COST . . . EXTRA-HIGH IN EFFICIENCY

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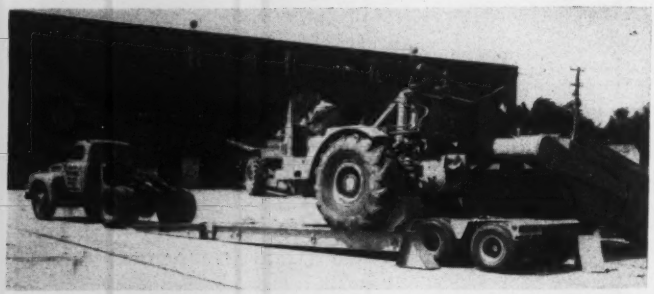
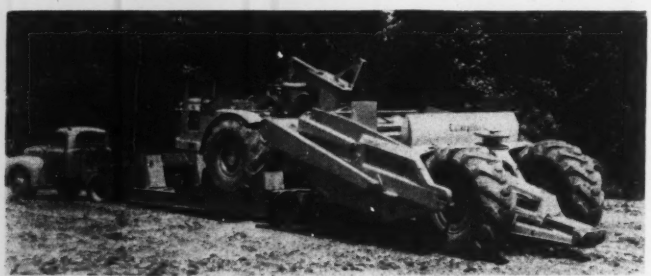


READY TO HOOK UP—Tractor-scraper unit has been drawn up alongside folding Martin trailer; then jackknifed until drive wheel hit chocks, with rear wheels on ground.

READY TO ROLL to a new location, gross combined weight of tractor-scraper and haul unit lies within legal load limits, since it's spread over four contact areas.



READY TO UNLOAD at its new job. Here process is reversed and truck driver must maneuver until tractor is again at right angles with scraper for easy unloading.

Gooseneck trailer can haul scrapers too

Many an ingenious contractor put in lots of time to figure out a way to haul both his crawler-mounted and rubber-mounted tractor-scraper units over the road and yet stay within maximum load limitations set up by state highway departments. He merely ran the tractor unit up on blocking and timbers until it was sitting just right on the rear end of a lowboy trailer, with the rear scraper wheels still out on the ground.

The idea caught on quickly and more and more contractors used the system. Lots of them learned the hard way that they should be sure of two things: To loosen all bearings and to increase tire pressures on those rear scraper wheels in order to prevent overheating and flexing on hard pavements at faster truck speeds. Meanwhile, many models of folding gooseneck trailers appeared, which needed no blocking or cribbing. This type of trailer could be converted into a sloping platform so that single units of equipment could be driven aboard quickly from the front end.

In order to haul tractor-scraper units, contractors complained, they would have to revert to blocking and timber ramps to load the front end and leave the rear end on the road. Not so, said the Martin Machine Co., and the accompanying pictures show how simply it's done.

The folding gooseneck is dropped and the truck unit pulled out of the way (top picture). Next the tractor-scraper unit is drawn up alongside with the pulling unit slightly ahead of the trailer. The tractor is then cut sharply and backed up the trailer ramp, jackknifing the scraper unit behind it, until the wheels hit a pair of rear chocks. Front chocks are quickly fastened and the gooseneck folded back and hooked to the truck unit.

Upon arrival at the next site, the process is reversed, with the truck driver maneuvering until he has jackknifed the trailing unit. He then drops the trailer bed again and the haul unit —in this case a "Cat" DW-21 tractor —pulls off and goes right to work.

The trailer is designated as F4T-21, and in addition to wheel chocks has a newly-designed rear kickup for proper clearance and load distribution. Martin Machine Co., Kewanee, Ill.

Reinforcing rods snipped or curled with bender

A new portable tool called Bend-O Shear easily bends and shears $\frac{3}{8}$, $\frac{1}{2}$ and $\frac{5}{8}$-in. reinforcing rods. According to the manufacturer, experienced construction men tested the tool and were amazed at its ease of operation. They were able to shear the rods easily, then bend them into 2- and 3-in. hooks. They're constructed with Torrington bearings and a single set of hard steel blades cuts all rods up to $\frac{5}{8}$ in. dia. It mounts over the end of a bench or plank and is portable. Lee Sales Company, 8439 Gainford, Downey, Calif.

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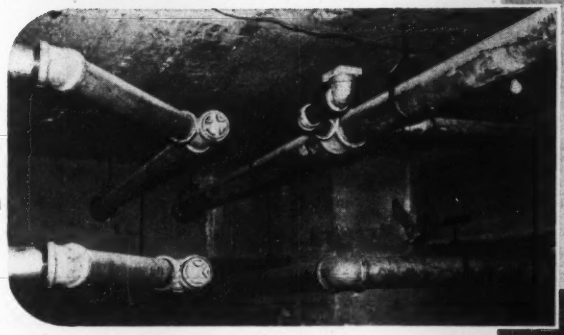
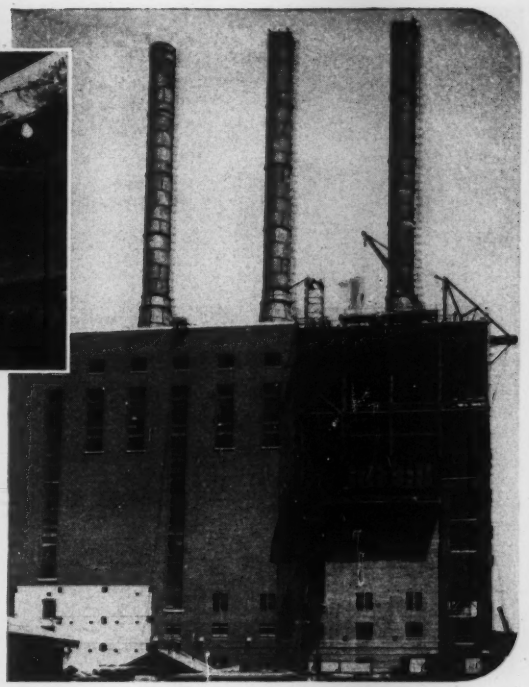




BYERS Wrought Iron Pipe

reduces maintenance in Niagara Mohawk's new POWER PLANT

The "built to last" standards of the Niagara Mohawk Corporation are reflected in its new power plant in Albany, New York. A typical example of the engineer's insistence on durability is the use of Byers Wrought Iron pipe in the plant's drainage system. More than 52 tons of this time-tested material was installed, in sizes ranging from 2 to 10 inches, to combat the rightfully anticipated corrosive hazards. A. J. Eckert Company, Albany, New York, handled the heating and plumbing requirements.

With today's maintenance costs so high, the importance of selecting the most durable material is obvious. The wisdom and economy of using Byers Wrought Iron pipe in drainage systems has been convincingly demonstrated in thousands of successful installations in power plants everywhere.

Our bulletin, WROUGHT IRON FOR PIPING SYSTEMS, discusses some of the corrosive conditions found in various services and illustrates a few of the many places where engineers have found greater economy in the longer life of genuine wrought iron. Write for your copy today.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Division: New York, N. Y.

Why Genuine Wrought Iron Lasts

This notch-fracture test specimen illustrates the unique fibrous structure of genuine wrought iron—which is responsible for the high corrosion resistance of the material. Tiny threads of glass-like silicate slag, distributed through the body of high-purity iron, halt and disperse corrosive attack, and discourage pitting and penetration. They also anchor the initial protective scale, which shields the underlying metal.

BYERS

CORROSION COSTS YOU MORE THAN WROUGHT IRON

WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

2 Big Extra Values for you!

...in JOY SILVER STREAK ROCK DRILLS

(1) EXCLUSIVE! CADMIUM PLATING INSIDE and OUT

Cadmium plating prevents rusting of JOY Silver Streak Rock Drills and spare parts while in use or in storage. In addition, the plating forms cadmium oxide under frictional heat and pressure. This so effectively acts as a lubricant that the inner parts will not score, *even if regular lubrication is temporarily neglected!* In addition to assuring a smooth "run-in," cadmium plating allows closer tolerance of precision fitting parts—vital factors in the power and long life of the drill.

(2) EXCLUSIVE! JOY DUAL VALVE "Makes Air Do More Work"

The fast, powerful JOY Dual Valve action results in more and harder-hitting piston strokes per minute, for faster drilling with less air. The right amount of air is admitted behind the piston on the power stroke, and air is excluded ahead of the piston, to exert maximum force on the drill steel. Then the Dual Valve meters just enough air ahead of the piston to return it with a fast, snappy action for the next blow. The air actually does more work!

W&D C 4028

Over 100 Years of Engineering Leadership

Consult a Joy Engineer

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

St Paul body and hoist line has fourteen models

A complete new line of hydraulic dump truck bodies and body hoists, featuring many outstanding features, has been announced by St Paul Hydraulic Hoist, subsidiary of Gar Wood Industries. Claiming up to 22% more payload than previous models, they're available in a selection of 14 capacities from 6 to 25 tons. A unique stress-eliminating design feature is said to absorb almost all dumping shocks, and permits use of a new principle in hoist design—a flexible sub-frame which ends tendency of rigid hoists to crack or bend when flexed.

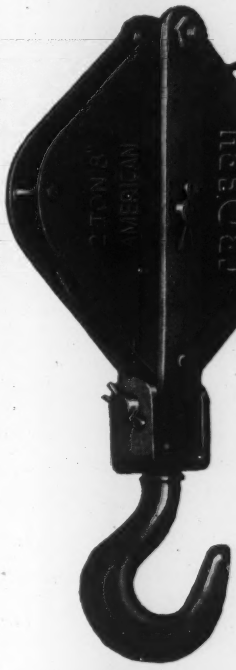
New contractor's type bodies were released as matching units for the hoists which are said to have the industry's lowest standard mounting height, advanced lifting point and new low-operating oil pressures. ST. PAUL HYDRAULIC HOIST, WAYNE, MICHIGAN.

Rubber lining prevents failures in pipe bends

By lining and covering pipe, fittings and process equipment with rubber, it is now possible to reduce maintenance costs, conserve space and prolong useful life of pipe-line and process equipment. In one of its applications the company can now line pipe from 1½" diameter up to any transportable size required. Before this new method was used, it was necessary to break a line for insertion of fittings to provide a change in flow. Insertion of fittings has been a distinct disadvantage and usually was impossible in

(Continued on page 92)

Your *SAFEST* buy in wire rope blocks



Load-Rated!

Here's a common-sense way to avoid the risk of accidents. American CROSBY Blocks are LOAD-RATED . . . safe working capacity permanently embossed in the side plate . . . so your men can *know* what load the block will carry.

PACKAGED

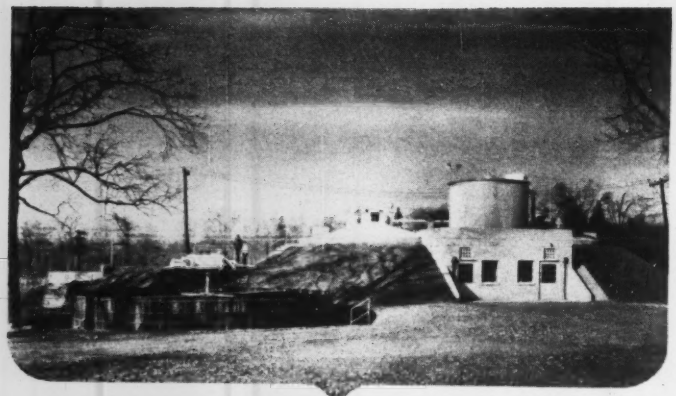
Your load-rated CROSBY blocks come in individual, factory-sealed cartons. Easy to buy, easy to stock and handle; delivered to the job in perfect working order. Sold by leading distributors everywhere.

American CROSBY

Load-Rated Wire Rope Blocks

Made by the makers of genuine Crosby Clips:

AMERICAN HOIST & DERRICK CO., ST. PAUL 1, MINNESOTA



How many parts per million
will kill a fish?

The treatment and disposal of industrial wastes has a lot to do with the health of fish — and people.

A plant in New Jersey had the problem of reducing pollution from 3,000 *ppm* in raw waste to 33 *ppm* in the final effluent. In planning the installation shown here, the consulting engineers called on Dorr for equipment recommendations. The resulting installation — involving equalization, predigestion, Biofiltration and slow sand filtration — is consistently providing the exact results for which it was planned.

It's a good idea to talk to Dorr about your processes involving the separation of finely divided solids in suspension, the use of ion-exchange or fluidizing techniques. The chances are that we can help you simplify your problem.

Better tools TODAY to meet tomorrow's demand

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THE DORR COMPANY • ENGINEERS • STAMFORD, CONN.
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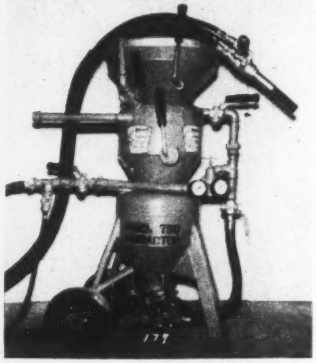
NEW PRODUCTS

marine and industrial installations where close clearances in limited space were encountered.

Now reportedly for the first time in industry, special designs of bent pipe and shapes can be lined with rubber without risk of processing failure. It is still recommended practice to place a limit of two 90-degree bends for each connected length of pipe, but through recent development of an improved application process, the company can now apply lining on three 90-degree bends in a single length of pipe as small as 4 inches in diameter. LaFavorite Rubber Mfg. Co., Paterson, N. J.



Smaller Bondactor available for gunning concrete

Incorporating the same basic principles for gunning concrete as its larger predecessors, the new #750 Bondactor was recently put on the market, designed for smaller contractors, municipalities and industrial maintenance departments as well as those larger contractors who want a smaller companion to their present larger Bondactors.

The machine can be hooked up to an 80 or 105 cfm compressor. Plant air, when available, is also suitable. The unit includes all accessories and hoses for hook-up and operation as well as the patented Bondact gun and sandblast nozzle assembly for wet or dry sandblasting. While designed primarily for gunning sand-and-cement concrete and for wet or dry sandblasting, the manufacturer claims that it will efficiently and advantageously gun many prepared masonry and refractory coatings.

It's a dual-compartment, completely pressurized machine, and it must use perfectly dry materials which are hydrated at the nozzle of the gun.

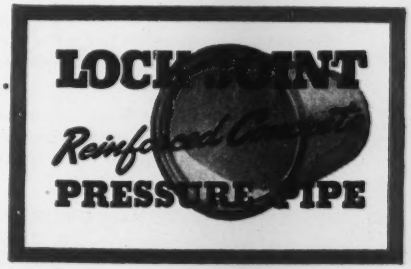
(*Continued on page 94*)

SERVICE TO THE HIGHLY INDUSTRIALIZED GREAT LAKES REGION is the main purpose of Lock Joint's permanent manufacturing plant on the outskirts of Detroit. Specializing in pipe 24" in diameter and larger for water supply lines, distribution feeder mains, cooling water or process water lines, subaqueous intakes and outfalls, the Detroit plant is ideally situated to serve such nearby industrial centers as Chicago, Cleveland, Gary, Akron and Toledo. Because of this convenient location, pipe from the Detroit plant can be economically shipped to other parts of the country, as well.

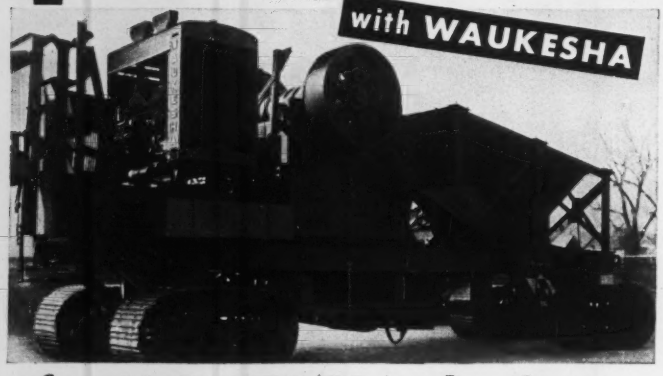
AUGMENTING THE DETROIT OPERATION are our three other modern permanent pipe manufacturing plants. Each of these plants is strategically located to serve the rest of the country East of the Rockies. The Wharton, N. J., plant covers the East; Columbia, S. C., the South; and Turner, Kansas, the Great Plains. No matter how large or small your contracts may be, if your pipe requirements are 16" in diameter or larger, you can rest assured that the efficient and economical answer to your pipe problem can be supplied from one of these four Lock Joint Plants.

SCOPE OF SERVICES—*Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply and Distribution Mains in a wide range of diameters as well as Concrete Pipes of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous Lines.*

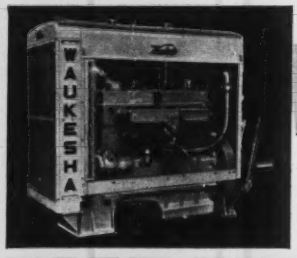
LOCK JOINT PIPE COMPANY
Established 1905
P. O. Box 269, East Orange, N. J.
PRESSURE PIPE PLANTS: Wharton, N. J., Turner, Kan., Detroit, Mich., Columbia, S. C.
BRANCH OFFICES: Casper, Wyo. • Cheyenne, Wyo. • Denver, Col. • Kansas City, Mo. • Valley Park, Mo. • Chicago, Ill. • Rock Island, Ill. • Wichita, Kan. Kenilworth, N. J. • Hartford, Conn. • Tucumcari, N. Mex. • Oklahoma City, Okla. • Tulsa, Okla. • Beloit, Wis. • Hato Rey, P. R. • Caracas, Venezuela



Pioneer packs in power



for U.S. ARMY rock plants

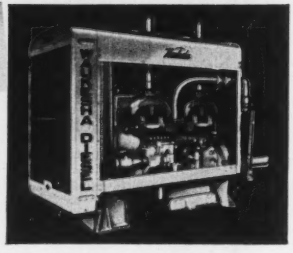


Gasoline

WAUKESHA Super-Duty Six Gasoline Unit (6-WAKU) — 6-cyl., 6¼-in. bore x 6½-in. stroke, 1197 cu. in. displacement powers the plant shown. Get Bulletin 1555.

WAUKESHA

Diesel



WAUKESHA Super-Duty Six DIESEL Unit (6-WAKDU) — 6-cyl., 6¼-in. bore x 6½-in. stroke, 1197 cu. in. displacement. Get Bulletin 1418.

The U. S. ARMY uses portable rock crushing, screening, and washing plants to produce aggregate for air bases, roads, and concrete structures. Shown is a 56-A Primary Crushing Unit, typical of these plants, which Pioneer Engineering Works of Minneapolis, Minnesota, build to U. S. Army Engineers' Specifications with a Waukesha Super-Duty Six Power Unit to drive the crusher, feeders and conveyor. Capacity is 300 to 400 tons per hour with crusher set at 6-inch discharge.

Waukesha Super-Duty Sixes... gasoline or Diesel... are the choice of power equipment makers, operators and owners alike —for lively acceleration, shock-free operation, and low upkeep with high fuel economy.

187

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS.
NEW YORK • TULSA • LOS ANGELES

NEW PRODUCTS

Production is from ½ to ¾-yd per hour, or the equivalent of three to four sack batches. It's recommended for surface applications over block or brick, waterproofing basements from the inside, repair of disintegrated or broken concrete and sandblasting of all kinds, under all conditions. AIR PLACEMENT EQUIPMENT COMPANY, 1009-11 W. 24TH ST., KANSAS CITY 8, MISSOURI.

New product briefs . . .

Flexible DUR-O-LINE **traffic lane markers** are now available to traffic departments for use at heavy traffic points to mark pedestrian and traffic lanes, according to an announcement from **Traffic Safety Supply Co., Portland, Oregon.** They can be applied on concrete, wood or asphalt surfaces just as easily as the rigid type and effect substantial economies over the use of yellow paint that must be repainted at frequent intervals.

A two-stage portable **transfer unit for cleaning hydraulic oils** in machine tools has been designed and built by the **J. N. Fauver Co., Inc., 49 W. Hancock, Detroit 1, Michigan.** Powered by a Yale & Towne pump, its first-stage filter is a Cuno Auto-Clean metal-edged type. The second stage filter is a Cuno Micro-Clean which filters out everything to 25 microns (one thousandth of an inch). All tubing and Parker fittings are to JIC standards and circulation rate is 10 gpm.

The Justrite Manufacturing Co., 2061 N. Southport Ave., Chicago, Ill. has introduced a new **safety red flashing lantern** for use in all Class I, Group D hazardous locations as well as any other spots requiring a warning or marking light. Portable and battery-powered, the Model 2146-S lantern houses a red lens and a sliding switch assembly which controls two bulbs. One position of the switch produces a steady red beam which can be instantly changed to a flashing red light by flipping the switch.

To facilitate making sharp **turns or takeoffs on flexible plastic pipelines, Carlon Products Corp., 10225 Meech Avenue, Cleveland 5, Ohio** has come up again with the first answer to the problem. They've developed new **insert type ell and tee couplings** and one fitting now effects a connection which might have formerly required three or four. Joining procedure is the same as on regular insert couplings. Stainless steel clamps draw the pipe into the serrations of the insert to assure a leakproof joint.

PUBLICATIONS

"Lighting for Industry" is the title of a new 96-page handbook that covers the field from general engineering information and economics of lighting to a listening of specified industrial areas. These are further grouped under indoor and outdoor requirements and the booklet is filled with technical diagrams, charts, sketches and installation photographs. A complete, up-to-date reference book, it's available from HOLOPHANE COMPANY INC., 342 MADISON AVENUE, NEW YORK 17, N. Y.

Simplified plant design—An economical plant layout, expandable to any future needs, is possible with Macomber steel trusses, sash, doors, decking, siding, columns, struts and girts. Framing plans, column connection details and examples of six different profiles are included in the 20-page booklet. One full-page chart shows safe loadings for roof trusses and bowstring chord angle sizes.—MACOMBER INCORPORATED, CANTON, OHIO.

Permutit gravity filters—Any engineer dealing with water problems will be interested in Permutit's new booklet on gravity filters and filter accessories. No. 2539A. All three basic types; concrete, steel and wood are included, and the booklet lists specifications operating characteristics, outline dimensions and installation photographs. THE PERMUTIT COMPANY, 330 WEST 42ND STREET, NEW YORK 36, N. Y.

Abrasive belt polishing—A 28-page, illustrated booklet titled "How Polisher Pete put Economy in Polishing" describes the advantages of coated abrasive belt polishing methods.—BEHR-MANNING CORP., DEPT F. P. #1, TROY, NEW YORK.

Ammonia refrigeration compressors—Specifications, pictures and descriptions of the following units are included in a new bulletin, C-1100-B38: Self-contained refrigeration units for ammonia; single-acting ammonia boosting compressors; 4- and 6-cyl high-speed ammonia compressors; vertical, single-acting, 2-cyl ammonia refrigeration compressors; horizontal, single double-acting boosting compressors; horizontal double-acting motor- or steam-driven compressors; 60-460-ton Y ammonia compressors; gas-engine refrigeration compressors. WORTHINGTON CORPORATION, HARRISON, N. J.

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EDITORIALS

Advance in concrete arches

THE UNIQUE open-spandrel concrete arch bridge on the Caracas-to-La Guaira superhighway described on page 28 is another fitting monument to 73-year old Eugene Freyssinet's genius in the use of prestressed and precast concrete elements. But, it is more an embodiment of the great French engineer's pioneering spirit. For careful analysis of the design indicates that it was his ingenious and daring method of formwork erection and support which dictated the column, cross beam and deck formation.

Utilization of cable-supported formwork for the arch ribs and consequent elimination of falsework can have a manifold effect on the economics of concrete arch bridges. This method was employed in Venezuela primarily to conserve precious lumber or expensive steel necessary for normal falsework construction. Its eminently successful application—from both structural and economic standpoints—raises interesting possibilities about its employment for bridges spanning bodies of water.

A major drawback to the use of concrete arch bridges over water is the difficulty and expense of founding and erecting falsework, especially in swift-running and very deep water. With Freyssinet's method, however, the formwork sections could be fabricated directly on an anchored barge, then floated out to position and hoisted into place.

To an American engineer, some of the other notable aspects of the bridge may seem foreign in more ways than one. The extremely thin spandrel columns are a vivid expression of the true nature of prestressed concrete—a construction material very different from ordinary reinforced concrete. These columns are designed as flexible members to take longitudinal expansion and contraction of the deck.

Because the arch ribs, in their hinge-connected state, were the sole support for later stages of construction, the deck had to be of precast and prestressed members. Cast-in-place concrete would have required large amounts of formwork whose support would have been difficult and dangerous.

Yet, the fact that there were more than one thousand separate elements comprising the deck did not prevent Freyssinet from prestressing the deck longitudinally and transversely so it acts as a 504-ft long 70-ft wide beam. Moreover, parts of this framework are held in place only by the squeeze created by tensioned cables.

This probably is the lightest concrete arch bridge of comparable size in existence. The saving in weight was due to the liberal use of prestressed elements, which in turn facilitated adoption of hollow-box ribs.

Further evidence of the designer's versatility with concrete is the large number of identical members employed in the bridge, making for remarkable efficiency in the use of forms (mostly custom-built steel).

Discussion of the bridge would also not be complete without mentioning the man who transformed the design into reality, Robert Shama, the project manager. To build a structure of this complexity required meticulous coordination—particularly when the arch was in a hinge-connected state and very likely to sway longitudinally had an unsymmetrical load been applied.

Better roads movement gains

THE MOVEMENT for better roads is gaining ground even though progress is discouragingly slow. Early this year, impetus was given that movement by the National Highway Users Conference when it set up a national committee to promote "Project Adequate Roads" (PAR) and began organization of local PAR committees. A further gain was made last month through creation of the National Good Roads Association, which is to be the coordinating group for the several state associations set up in recent years in a revival of the movement that gave this country its first state highway systems (ENR Aug. 21, p 69).

Not to be overlooked as part of the current movement is the growing number of display advertisements in national publications designed to keep the need for more road funds before the general public.

Organizations set up to promote an expansion of the nation's road-building program are not going to have an easy time reaching their goal. Progress may be similar to that of a car trying to get back into any one of our big cities on a pleasant Sunday evening.

Chief obstacle to progress will be the many spokesmen for tax-conscious organizations. These men know their way around state and national legislative halls. They watch all legislation that might add materially to taxes, and when they spot such bills, they set their local or national groups to work building up opposition.

A good example is the attack on the PAR program of the National Highway Users Conference by Representative Page Belcher of Oklahoma inserted in the CONGRESSIONAL RECORD late in June. Some organization opposed to any increase in federal spending for highways obviously had supplied the Congressman with misleading figures indicating that the PAR program contemplated stepping up the road-building program to $7 billion a year for the next 15 years. That spurred Congressman Belcher into an attack on the whole movement.

The way to meet those methods is by multiplying the number of people in close contact with members of state and national legislators who know the real facts about local road needs. State good roads associations and local PAR committees are in that class. Hence, each new good road association or PAR committee increases the probability that needed highways will be built soon.

ANOTHER BREAK IN THE DIKE!

Tough words to hear when you're battling a river on a rampage. But that's what happened during the recent disastrous floods on the Fraser River in British Columbia.

Perhaps you don't have to keep "rivers caged up," but that's an important job for Fraser River Pile Driving Co., Ltd. and their experience *again proves* the unusual mobility and handling ease of MICHIGAN cranes.

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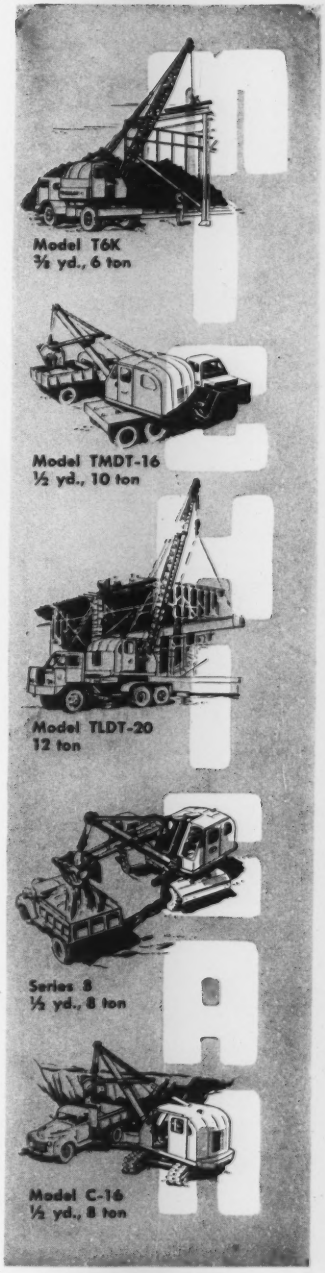

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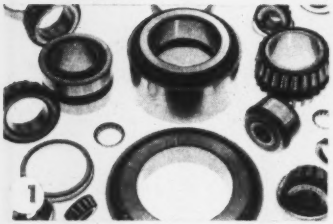

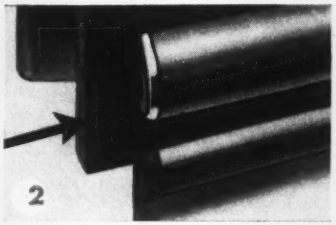

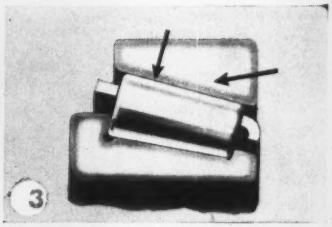

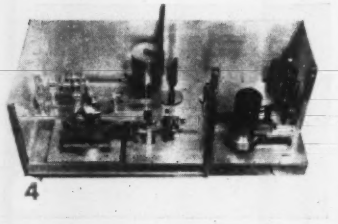

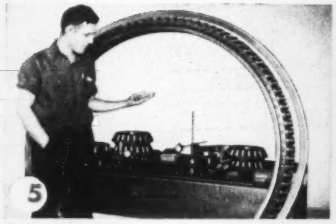

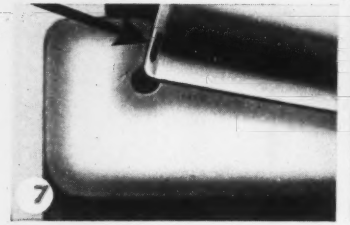

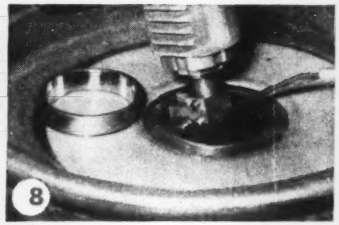

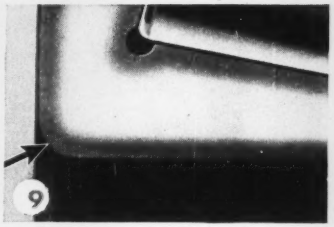

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